

WILD ANIMALS IN CENTRAL INDIA.

BY

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CONSERVATOR OF FORESTS

ILLUSTRATED

SECOND IMPRESSION.

LONDON

EDWARD ARNOLD & CO.

1927

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REPRODUCED AND PRINTED IN GREAT BRITAIN BY
LOWE & BRYDONE (PRINTERS) LIMITED
101, PARK STREET, CAMDEN TOWN, N.W. 1.

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PREFACE

The literature on sport and on the habits and natural history of the game in India can be divided conveniently into three epochs. There is first of all ancient history, in which we get glimpses of the game and sport of the remote past. Amongst such works mention may be made of Marco Polo, and the diary and reminiscences of Baber and Akbar. From these we gather that the Mogul Emperors and their predecessors were mighty hunters. It may be interesting to note that one of Baber's favourite pastimes was hunting rhinoceros on the Indus. The nearest place to the Indus in which this animal is now found is the Nepal Terai.

The commencement of the second epoch may be said to have arisen about the beginning of the last century, when various accounts of sport and animals were published, mostly emanating from Bengal. The middle of this epoch covers the period from the Forties to the Seventies, which was prolific in books on sport and animals, followed by works published a good deal later, but the contents of which essentially refer to the same period. Without pretending to be exhaustive, the following authors belonging to this period may be mentioned: Baldwin, Blyth, Williamson, Rice, Shakespeare, Burton, Macmaster, Kinloch, Campbell, Barras, Hawkeye, Hume, Hodgson, Forsyth, Gordon Cumming, Sterndale, Simson, Sanderson, Jerdon, Pollok, Hamilton, Ball, Elliot, Leveson, Baker, Pollock, and

Macintyre. Jerdon and Sterndale also published natural histories on the animals of India.

In spite of a tendency in some cases to exaggerate, perhaps not unnatural considering the circumstances, many of the books of this period are excellent reading and give one much information about the animals of those days. To a great extent, however, they are past history, as the animals were not only hunted but found under conditions which no longer exist, and one would now look in vain for tiger or bear in country which in those days provided the regular hot weather beats of the most famous shikaris. In those days the Central Provinces were far afield, and as most of the sportsmen could find all they required in more accessible spots, it is not surprising to find that Forsyth and Sterndale are the only writers who deal entirely with the Central Provinces, and only one or two of the others devote a few chapters to experiences in Berar and Khandwa or expeditions from Kamptee.

✓ The third epoch consists of more or less modern literature, and includes such authors as Felix, Russell, Blanford, Cookson, Eardley Wilmot, Hornaday, Hicks, Digby Davies, Glassfurd, Lydekker and Best. Of these only Hicks, Glassfurd and Best deal with the Central Provinces, and in addition, Felix hunted in Asirgarh. Blanford's *Mammalia* is an excellent and comprehensive work, much the best book yet published on Indian mammals. Lydekker's *Great and Small Game of India*, published subsequently in 1900, although much more pretentious, gives the impression of being largely a compilation, adds little to our knowledge, and is not to be compared with Blanford's earlier work.

The birth of the Bombay Natural History Society in 1883 and the excellent periodical it has published since 1886, have done more than anything else to

stimulate an interest in animals throughout India, and excellent notes on their ways are constantly published, some of which refer to the Central Provinces.

My experience of the Central Provinces consists of twenty-one years passed in the Forest Service. As this may not convey much to some of my readers, it is necessary to explain that Forest Officers habitually go into camp in November and remain under canvas living in the forest until April. They also frequently visit the forest at other times. Other Government officials occasionally visit the forest for short periods, often under some pretext, but the officers of no other department habitually live there. Other visitors are the permit holders who spend a month or two shooting in the particular block allotted to them. Kipling, in describing the Forest Officer's life, has said : " But since a Forest Officer's business takes him far from beaten roads and regular stations, he learns to grow wise in more than wood-lore alone ; to know the people and the polity of the jungle ; meeting tiger, bear, leopard, wild-dog and all the deer, not once or twice after days of beating, but again and again in the execution of his duty. He spends much time in saddle or under canvas—the friend of newly planted trees, the associate of uncouth Rangers and hairy trackers—till the woods that show his care in turn set their mark upon him."

During my service I kept diaries and notes of my doings and especially of anything of interest displayed by an animal. For about six years I practically ceased to shoot, and it is to this period that I am chiefly indebted ; one can see so much more of an animal, and under such different circumstances if one is not intent on killing it. This book is largely compiled from my diaries and notes and is an attempt to generalize the

scattered observations therein recorded. Any statement made on the authority of another person will be clearly recognized from the context.

Anyone who purchases this work in the expectation of being thrilled by personal adventures of the author will be disappointed. The contents aim at describing the ways, habits and characters, and their relations towards each other, of the more important animals of the Central Provinces. The personal experiences of the author are introduced to illustrate some habit or characteristic of the animal. The book, therefore, is in no sense a book of "shikar" in which the most important character is, of course, the shikari himself, and we are chiefly told what he did and how he did it, the animal under discussion being relegated to a very secondary position. Nor does the book trespass in any way on the work of the Museum Naturalist; comparative anatomy and structural differences are only lightly touched upon: its object is to supply information to the field naturalist and sportsman who takes an intelligent interest in the animal he is hunting, and what true sportsman does not do this?

Although the hunting and killing of the various animals are dealt with, the book does not claim to be a guide to accomplish these ends. Beyond laying down a few broad principles and briefly describing the various methods of hunting, with some details added, the sportsman is left to pursue the animal as best he can, basing his methods on his knowledge of the animal's character as depicted. To have gone beyond this and to have written a text-book of shikar would not only have unduly swollen the contents, but would also have been outside the scope of the work.

As most of the game animals of the plains of India are also found in the Central Provinces, some of them

indeed reaching their highest development in this part of India, it is claimed that the contents of the volume are not merely of Provincial interest. Anyone interested in the ways of wild animals generally as well as all those who only take an interest in Indian game will, it is hoped, derive some pleasure and profit from the perusal of the following pages. The work only deals directly with the Central Provinces, but the differences in the circumstances under which the animals live in many of the surrounding tracts are so small as to be negligible; the title given to the book is therefore justified.

Within the sphere of the Central Provinces I would include, Kandesh in the Bombay Presidency, the southern parts of Indore, Dhar, Bhopal, and Panna States, the Rewah State, Sirguja and the Bilaspur, Zemindaris, Bastar, the Feudatory States and the northern portion of the Nizam's Dominions. Roughly speaking, the Central Provinces lie within these territories, and there is no type of country found within the Provinces extending over an area of 130,000 square miles with which I am not thoroughly familiar.

Broadly speaking, the above-mentioned area can be divided into two main geological zones separated by a line running north and south through Nagpur. To the west of this line, trap and volcanic formations are found with their accompanying mixed forest and teak (*Tectona grandis*). The eastern zone consists of sandstone, metamorphic rocks and crystalline formations; and, as one penetrates into this area, Sal (*Shorea robusta*) forest is met with, until eventually this species predominates everywhere. Large grass maidans are also a feature of the zone. This geological cleavage and the consequent difference in the type of vegetation have had some effect on the distribution of the animal

kingdom, the most important of which is that the wild elephant, the buffalo and the barasingha are only found in the eastern zone, and it is doubtful if the latter ever existed outside of it excepting in one outlier of a similar geological formation.

Details regarding modifications of structure, habits or character owing to environment, will be found regarding each animal whenever these were noticed. From the analysis and grouping of the observations made on the various animals a few general laws regarding the habits, senses and characters of the animals can be formulated. The most general law throughout the jungle is the universal suspicion of what has not been identified. The chief means of identification are smelling and seeing, hearing being quite secondary to these two. After identification of an object, alarm, fear, tolerance or friendship, according to circumstances, takes the place of suspicion.

There is a direct relationship between the development of the various senses and the kind of country frequented by an animal. This general rule is subject to modification according to some particular habit of the animal, or to its belonging to the orders Ungulata or Carnivora.

Ungulates which live in country where they can habitually see to a great distance round them have excellent eyesight, moderate scent, and poor hearing. The animal which lives in bare hilly country does not come within this definition as his view is often exceedingly limited. We therefore find that animals living under these conditions have good noses as well. Animals living in moderate cover have all three senses fairly acute and more or less equally developed.

Animals living in dense cover have splendid powers of smell, excellent hearing and poor eyesight. The

exception to this is that all animals which are habitually noisy themselves have poor hearing.

The development of the senses in the Carnivora depends more on how they obtain their food than on environment. Those which stalk and spring upon their prey have good hearing and eyesight and poor noses. Those which run down their prey or find their food by smelling it, depend chiefly on this sense which is highly developed, and their hearing and eyesight, while often good, are of secondary importance.

Nevertheless, they are subject to a certain modification due to environment; for in those which habitually inhabit open country the eyesight is good and the hearing moderate, while in those which live in dense forest the relative acuteness of the two senses is reversed.

In dealing with the senses of animals generally, it has been my experience that these laws have a very wide application, and that departures from the same can generally be explained by some special peculiarity of the animal and treated as an exception.

If I have failed to make my meaning clear in my description of the habits and characteristics of animals, then I crave the indulgence of my readers, as I lay no claim to literary skill.

A. A. DUNBAR BRANDER.

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WILD ANIMALS IN CENTRAL INDIA

CHAPTER I

THE SLOTH BEAR

So common and conspicuous an animal as the Indian sloth bear has naturally been commented upon at some length by naturalists and sportsmen, and a considerable amount of information regarding its habits has been published. In writing this chapter, it is impossible to avoid repeating what has already been said ; nevertheless there is some scope for breaking new ground as regards his habits and character, and in addition it is possible to lay to rest certain errors which have been handed down from the earliest writers.

Scientists have classified this animal as a separate genus by reason of structural differences, chiefly in the skull, the most important of which is the absence of two median incisors in the upper jaw. These are missing even in the young, and as this animal has been found in a fossilized state, it is evident, that not only did these structural differences develop at a very remote period, but also, that the Indian sloth bear in his present form has been an inhabitant of India from the very earliest times. It is not surprising therefore to find that, besides being found generally throughout India, it also occurs in Ceylon. On the other hand, without apparent reason its distribution eastwards is bounded by Assam. It is therefore essentially an

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Indian animal and is found wherever suitable conditions exist. These are a sufficient range of jungle to afford sustenance; tracts which also contain piles of rocks, boulders and caves for shelter, being specially favourable. Many parts of the Central Provinces provide for all his requirements and no part of India is more suited as a field for studying his habits.

Although conspicuous in the open at a distance, in the jungle the bear resembles one of the black trap boulders amongst which he so often lives. A closer inspection shows him to be a large black shaggy animal with a white horseshoe on his breast and a whitish mangy-looking face; hairless rims round his wicked little eyes and large dirty grey protruding lips and snout. The hair is long, especially so on the shoulders, and there are often two well-defined tufts on the back coincident with the position of the cub's feet when carried. The best coats are usually found in animals killed at the end of the cold weather, but this rule is not invariable, as I have seen splendid pelts in the middle of the hot weather and the condition of the fur depends to some extent on the well-being of the animal. The front legs are bowed, and the forefeet are turned inwards. The claws are white and extraordinarily powerful, especially so on the forefeet, where they attain a length of 4 in. The chest is flat like a man's, and the pug-marks, as well as the corpse when skinned, somewhat resembles a man's. There is a short tail of 4 in. or 5 in. in length. The flesh is dark in colour and the whole animal is one mass of muscle. For their size they are immensely powerful, and in addition possess great vitality.

Very rarely instead of being black the animal is brown. I have seen three specimens, one adult and two immature skins. These were in the possession of

Mr. Kenny, Conservator of Forests, who procured them in the Melghat about the beginning of the present century, and when I was there some ten years later a few brown bears still existed. Mr. Kenny informed me that the brown cub was one of two, the other as well as the mother being black. In the other instance a full-grown brown mother was accompanied by a half-grown brown cub, both of which he shot. A brown bear has also been reported from Hazaribagh. It is presumed that originally all bears were brown, and that reversion to the primitive type occasionally takes place. Bears vary greatly in size, and generally speaking this depends on the abundance of food in the locality. Moreover as they do not cease growing until three years old, and continue to "furnish" for a number of years after this, there is much difficulty in determining what is a mature animal and in deciding upon a fair average size. Many animals are classed as mature which would still continue to increase in bulk. It has been recorded that a bear has lived in captivity for forty years. It may be stated, as a general rule, that the greater the age an animal attains, the later in life is the period of full maturity. It is probable therefore that many bears continue to grow after being three years old, and it is certain they continue to increase in bulk until eight or ten years of age.

The following are the measurements of a male somewhat above the average:

Length, including tail	5 ft. 7 in.
Length to heel, i.e., height when standing up	6 ft. 9 in.
Girth of body	4 ft. 3 in.
Height at shoulder	2 ft. 8 in.
Girth of forearm	1 ft. 10 in.
Girth of neck	2 ft. 11 in.
Girth of head	3 ft. 2 in.
Weight	320 lb.

Again, out of a number of weights and measurements the lowest recorded mature male was only 198 lb., and again, a female scaled 273 lb. It is fairly correct to say that fully mature females average about 230, and males 260 lb. The sexes do not vary greatly in size. A weight of 423 lb. has been reported from Cooch Behar, and I once slew an enormous specimen in Mandla which certainly exceeded 400 lb. Unfortunately I was unable to weigh it. This animal in bulk and shape resembled a large water butt, and it was a revelation to me that a sloth bear could attain, and actually had attained this size: such animals are however quite exceptional.

◀ Bears breed in the hot weather and the cubs—usually two in number, and occasionally as many as three—are born about seven months afterwards in the cold weather. For this purpose the mother selects a cave or an earth in a bank and bears will be found returning to the same lair year after year. The cubs when born are blind and remain so for about three weeks. When still quite young and no larger than a "Cairn terrier" they are carried back and fore to the feeding ground at night on the mother's back. When the cubs are larger the lair may be abandoned, and the mother with the cubs on her back may be found in the jungle during the day. I have seen a cub as large as a spaniel on the mother's back, and this constant portorage must be an intolerable burden on her. The way in which the youngster retains his perch, even when the mother is going at full gallop over the roughest ground, is always a matter of astonishment, and I have only once seen one unseated and on this occasion there were two "up." The young often remain with the mother up to the second year and bears normally breed only once in three years.

Bears are exceptionally fond of their young and will defend them in the most determined manner. In fact, a she-bear with cubs is a most dangerous animal to disturb. Adult bears are also affectionate towards each other, and express sympathy if a companion is wounded. Displays of maternal solicitude are numerous. An extreme instance of affection for a companion has been recorded by Col. Gordon Cumming. In this case a he-bear removed his dead companion with the apparent object of affording her succour.

Except to shelter the young, bears are less addicted to frequenting caves and earths during the cold weather, and they are more likely to be found "at home" from April onwards. Lack of cover in the jungles, and protection from heat and flies, is the reason of this. It is necessary to add, however, that in spite of his long hair and dark coat, the bear is very tolerant of heat, much more so than the tiger, and he will be found sometimes during the hottest part of the day exposed to the direct rays of the sun. Bears retire to their resting place in the early morning, and it is seldom one sees them on the move an hour after the sun is up, especially in the hot weather. They are very heavy sleepers and sometimes one can almost tramp on them before they awake. In the evening they anticipate the sunset and will be found on the move at an earlier period in the afternoon than one would expect in an animal who retires so soon after the sun is up. He has, of course, been on the move all night and desires rest in the morning. Moreover, the impulse of hunger is wanting. In spite of the above remarks one must not conclude that bears are nocturnal animals, and occasionally they may be met with foraging at any time of the day.

In the hot weather their first proceeding in the evening is to drink and they certainly always drink at least once a day, if not twice. In sandy rivers they constantly dig holes to obtain water. The rest of the night is spent in the quest of food, and they often cover immense distances to obtain a meal. When belated and returning to their lair they progress at a very rapid walk or shuffling trot, and if disturbed break into a clumsy gallop which takes them over the most impossible ground at an amazing speed. No animal in the jungle has to work harder than the bear for his food, and no other animal has such a varied diet, or one which has to be procured in so many different ways. For this reason, and also on account of the varied uses to which he puts his paws, the bear has developed into the most intelligent animal in the jungle, the Primates excepted. Bruin has to be both a botanist and an entomologist. The degree of his intelligence is confirmed by the ease with which he can be trained in captivity. His food consists of fruits, roots, flowers, tubers, berries, insects of all sorts and honey. He has to know where, and when, and how, to procure all these things. This entails an accurate knowledge of the seasons, their effect on his food supply, and the habits of the plants and insects he feeds on. It must not be supposed that there is a constant and overlapping supply of food; this is not so, and a main source of supply may cease before another is ready, and the bear has to know, in every sense of the expression, how to "fill in the gaps."

His chief diet consists of Ber berries (*Zizyphus Jujuba*), the fruits of Achar (*Buchanania latifolia*), various Tendus or ebonies (*Diospyros*), Amaltas (*Cassia Fistula*), Jamun (*Eugenia Jambolana*), Figs chiefly (*bengalensis*

and *glomerata*), Bel (*Ægle Marmelos*), and the flowers of the Mohwa tree (*Bassia latifolia*), white ants, honey, and insects of all sorts, as well as a large number of unconsidered trifles which come his way. The time of plenty is when the fleshy calyx of the Mohwa tree is continually dropping, and it is an extraordinary sight to see the bears competing with each other so as to be first on the spot. The bulk of the country spirit is distilled from these flowers and they are carefully gathered by the local people during the day, but the night belongs to the bear and it is a case of first come first served. There is a common belief that on occasions the bears become intoxicated as a result of eating fermented flowers. The normal behaviour of a bear can be so eccentric that no East End policeman would care to swear that he was not under "the influence." On one moonlight night in the Melghat, camped beside some Mohwa trees, from the tent door, I saw seven bears in the course of an hour rush from tree to tree, and then dash off to visit another clump.

It has been stated that they occasionally eat eggs and carrion, and although I have never known a case it is quite conceivable, especially in any tract where normal food was deficient. The only instance of their eating flesh which I have come across was in the quite exceptional case of the Chanda man killers. For about six weeks a she-bear and two almost full-grown cubs were the terror of a jungle tract in Chanda, and it was most definitely stated that on more than one occasion parts of the victims were eaten. Tame bears, even when quite young, will eat meat readily. In their search for food bears constantly have to climb trees for fruit and to rob bees' nests. In attacking a bees' nest they generally knock the comb on to the

ground, descend, and eat it there : the bees are handicapped by the darkness, and instead of following their nest, tend to concentrate round the place where it originally hung. It is common for a tree to contain a number of bees' nests, and I have known a bear return night after night, dealing with only one nest at a time. No doubt his long hair is a valuable protection, but all the same it would seem as if "the little folk" were sufficiently formidable to deter the bear from dealing with all the nests at one time.

When the bear is treed in this way or even found up a tree in the day-time, the sportsman may imagine he has an easy task in hand, but this is not so, and the bear should be approached with the utmost caution. On realizing his danger, he slips behind the main trunk, and rapidly descending without exposing his person beyond one hurried glance round the edge of the stem, he will drop the last 15 ft. and make off at a gallop, keeping the trunk of the tree between himself and his enemy. I have been "sold" on several occasions by a careless approach. It is necessary to remember that trees in the Central Provinces are comparatively bare, and where the foliage is commonly denser their behaviour would probably be different. They can climb any tree and are not limited to those with rough bark.

One of the commonest trees climbed is the Koha (*Terminalia Arjuna*) which has smooth bark, and on which the marks of the bear's claws remain for years. It is quite a common thing to find a Koha tree which has been climbed regularly every few months, and as there is absolutely no sign of any food having been obtained, one is puzzled to account for the phenomenon, especially as it is well known that the bear has little time, and less inclination, to devote to fruitless efforts

of this nature. It is probable that on the first occasion on which the tree was climbed a bees' nest was robbed; subsequently, the marks on the tree being observed by another bear, he climbs the tree "on spec" and to find out why his brother went up, and so the climbing is repeated interminably.

In searching for insects he displays great ingenuity. In attacking a white ants' nest he burrows into the base until he reaches the core; the finer dust is then dispelled by blowing, and possessing great powers of suction, the termites, as well as a considerable amount of earth, are then drawn along the galleries into his mouth. In carrying out this performance the sound produced by the violence of his inhalations can be heard at a considerable distance. It has even been stated that he can suck out a grub from a piece of timber. It is common to come on huge holes dug by bears often on a jungle road. I once witnessed a bear digging a hole of this nature. The bear stopped, and after sniffing the ground intently for perhaps half a minute, he suddenly set to as if his very life depended upon it, and the earth simply flew out, in a manner that suggested the use of some mechanical contrivance. In an incredibly short time his head and fore-quarters were out of sight. He presently raised his head, and having evidently accomplished his task, I shot him. He still held in his mouth the broken shell of a dung beetle's cocoon which contained a large white grub. Considering the labour entailed merely to procure this toothful some idea can be formed of the amount of energy expended by a bear in keeping himself alive. It is necessary to add, however, that sheer hunger may not have been the only motive, and he cannot escape the accusation of being somewhat of a gourmet.

Another common method of getting insects and food is to turn over the stones in the bed of a nala, and grub underneath on chance with their blubberous lips. On one occasion while sitting on the banks of a jungle stream in Chanda I witnessed this performance. It was about ten o'clock and a beautiful moonlight night. My attention was first of all drawn by a most singular bubbling, squealing and squeaking, accompanied by a noise that sounded like a cart being driven over stones. The noise gradually approached and presently two bears fed right past me. The noise like the cart was caused by the clattering of the displaced stones, and the bubbling and squeaking was a conversation in bear language, probably expressing their pleasure, and the extent of their luck as each stone was turned. I have never heard such an extraordinary mixture of sounds, or such a sustained conversation expressed by any animal.

Blanford states that except in puffing and humming bears have no call for each other. The humming referred to is of course the peculiar sound they make when sucking their paws, a habit they are much addicted to. To limit their powers of expression to this extent is entirely contrary to my experience, as in addition to the extraordinary variety of sound already detailed, I have often heard them grunt to each other, and have heard the mother summon her cubs in the same way. It is believed nearly all jungle animals have a mother cry to summons the young.

In addition to this they sometimes utter a loud grunting noise when charging. It is also well known that a bear hardly ever receives any but an instantly fatal bullet without complaining to all and sundry by roaring, yelling and whining at the top of his voice, in order to announce to the whole jungle

the dastardly thing that has been done unto him.

The habit of sucking their paws is difficult to account for. The fore-paw of a bear is very much his "right hand" and on most nights they have had a hard time. Although I have never observed this myself it has been definitely stated that they will even suck each other's paws. This does not preclude the theory that the suction is in the nature of a salve to the bruised pads, as there are instances of other animals assisting each other in matters of this sort. One of the commonest is that of a pony scratching another's back. Such assistance, however, is usually proffered when the animal has difficulty in dealing with the trouble itself. Many animals when tamed will readily lick the palms of one's hands. There is a certain secretion of greasy matter, possibly of a saline nature, between the pads of a bear's foot and it is possible that this may be the attraction. These remarks are only in the nature of suggestions regarding a very curious habit.

Bears moving in the jungle are noisy animals, and they take little care to go quietly. As is usual in animals which behave in this way their hearing is poor. Their eyesight is also poor.

It is necessary to admit that an animal which can scent a grub 3 ft. under the ground is gifted with a strong sense of smell. Nevertheless, their behaviour in beats or when stalked or hunted, gives one the impression that their powers of smell are very moderate and it is quite possible to approach them down wind. At first sight it seems impossible to reconcile these two statements. The following theory is propounded as being a possible clue to the matter. We all know how greatly the eyesight of animals varies and is

adapted for the particular uses to which it is put. A peacock or jungle fowl can instantly spot a small seed almost indistinguishable from the surrounding sand. These birds can also detect one at once, when sitting motionless in a tree—their eyes are specially adapted to deal with minute objects, and to pick out objects from their surroundings at close quarters. There is admittedly no evidence that they cannot see equally well at a distance, but there is at any rate a reasonable doubt that this is so, as they appear to fail to detect one until fairly close and then they suddenly, and invariably do. We know that a vulture which soars at a great height has a wonderful eye for seeing at a distance, but when he comes to earth his eye compared with the peacock's is poor. Ears also are adapted to be specially sensitive to particular sounds. We know very little about smells and the sense of smelling: there is no instrument to measure smells, and there is consequently no science of smells. The powers of smell in the domestic dog seem to indicate that this sense functions in different ways: a spaniel will puzzle out a ground scent, but unlike a pointer will fail to appreciate a wind-borne smell from a distance. Is it however outside the bounds of possibility that the bear's organ is specially adapted for detecting minute smells at short range, and is much less susceptible to an even larger smell at some distance? In other words, is he short scented? Certain it is that the former gift is much more useful to him, and much more constantly exercised. His relations with the other animals in the jungle are such, that he does not require to smell things at a distance for self-protection. We are all aware of the fact that we ourselves constantly fail to detect a smell until our attention is drawn to it, when by "consciously" smelling it is perceived.

Is it further possible, therefore, that the bear's apparently moderate powers of smelling man are due to his nose being constantly "focussed," so to speak, on particular things in his immediate vicinity? Be this as it may, from the hunter's point of view, I would classify him as an animal with only moderate powers of smelling, and with poor powers of hearing and eyesight.

The bear's character is one of the most interesting, but at the same time, most baffling studies of all the animals in the jungle. It is so varied and unstable that no one can say he "knows" the bear, his actions are too inconsistent. The key to the bear's being is a ceaseless effort to obtain sufficient food of divers sorts to maintain and reproduce himself. We know that he has undergone no change and has been living the same sort of existence for untold years. Under these conditions an animal's habits and senses tend to become fixed, and adaptability to changed conditions becomes difficult or slow. The bear is sufficiently formidable not to have found it necessary to attain a high development of his senses for purposes of self-protection.

The mutual relations between the bear and other animals is one of indifference. He goes his way unheeded and unheeding, all he desires is to let alone and be let alone. It is true the noisy ape will sometimes scream at him, deer will also trumpet, but this is only on hearing him, as the sound he makes in marching through the jungle much resembles a man's, and to a lesser degree a tiger's. He is "in" the jungle but not "of" the jungle, a "being" apart. He finds an occasional enemy in the tiger and there are cases of his having been killed. I myself came across a case in which a bear had been horribly mauled and

blinded by a tiger, but not killed. The poor beast was wandering helplessly on a fireline. By backsporing its trail the scene of the combat was reached, and it was evident that the tiger had also left the ring bleeding profusely. Mr. Kenny experienced two cases, and in one instance the wild Baigas removed the hair of the dead bear to supplement the scanty locks of their women folk. It would appear therefore as if "pin curls" were not a modern invention! These occurrences, however, are not sufficiently frequent to have had any effect on his character—the indifferent way in which he noisily tramps through the jungle is evidence of his contempt for any possible enemy amongst the jungle folk.

Taking his life history into consideration, it is probable that it is only within comparatively recent years that he has been systematically hunted by man. This menace has not been of sufficient duration to develop his senses. Such changes appear later, and after the animal has changed its habits. The persecution he has undergone during the last seventy years or so has probably so far, only affected him to the extent of making him more nocturnal and shy, thus acquiring protective habits as apart from protective senses. The key and the guiding principle of an animal's character are to be found through its senses, generally one sense or at most two. Senses develop before instinct and reason. The character and actions revolve round the dominant sense. It is through this sense that the brain chiefly acts, and it is this sense that determines the main characteristics of the animal. We have already seen that except for a highly specialized sense of smell he has no highly developed sense. The poor bear, therefore, although possessing one of the finest brains in the jungle is without a guiding principle,

and to this I attribute his extraordinary and often contradictory behaviour.

It is a jungle axiom that one never can say what a bear will do. He is a creature of sudden impulses, suddenly making up his mind to do a thing, and as suddenly changing it. Instances in which bears act in a certain way on a particular occasion, and then on a similar occasion behave in an absolutely different way, are numerous. Excepting those cases in which the motive is maternal solicitude, attacks on men are mostly due to sudden impulse, and the whole thing is over before the bear rightly realizes what has happened. He does not hear the man approaching until quite close, he hasn't smelt him, he turns round and makes out an object but dimly, which he promptly charges, knocks down, and scalps with two or three scrapes of his fore paws. He then bolts. He seems to have no alternative between bolting or charging. Unlike the tiger he has no training or instinct for concealment, or crouching and slinking off. But for this habit of the tiger it is probable he also would be a much more dangerous animal to meet than he is. Numerous attacks of the above nature are made, and the uncertainty of the bear's character renders him by far the most dangerous animal an unarmed man can encounter in the jungle. There are, of course, cases in which bears have become really vicious and will deliberately pursue a man. Mention has already been made of certain exceptionally vicious bears in Chanda. The behaviour of these bears on one occasion affords a typical example of the uncertain, impulsive nature of the bear's character.

Two of my subordinates were marching along a jungle road, one on foot, the other on a pony. The three bears came out of the jungle, attacked the man

on the pony, knocked him over and mauled him. The man on foot was standing petrified with fright some 20 yards off. One of the bears charged right up to his feet, then left him, and returned to the other two. It did this no less than three times, and then bolted off into the jungle.

When bears charge they present an easy mark and their attack is not accompanied by the premeditated stealth of a tiger's or a leopard's, and lacks the element of surprise. When fired at, or wounded and followed up, bears will charge; in doing so they come on at a lumbering gallop. In seizing their enemy I have never known them to stand up on their hind legs or attempt to hug. Their usual method is to knock the man over and burrow off his face and scalp with their fore paws; they nearly always attack the head. On occasions they will bite, but their chief weapons of offence, and those on which they rely, are their fore paws. Records show that they do sometimes stand up on their hind legs in attacking, but I think this must be the exception. I have often seen them stand up on their hind legs or climb a tree for purposes of obtaining a better view, and I once came on one sitting on his hind quarters leaning against a tree just like an old man.

When attacked by dogs they endeavour to sweep a dog to destruction by a scythe-like blow of the fore paw. If wounded on the face of a steep incline they will sometimes roll themselves into a ball, and catherine wheel down the hill; while doing this, it is extraordinarily difficult to get in an effective shot, and if an attack is meditated they unroll when on a level with the sportsman and charge. Firing at a bear immediately above one is therefore attended with a certain amount of risk.

The perusal of old books on sport, and the accounts of old shikaris, show that seventy or eighty years ago, bears, compared with modern conditions, occurred in almost incredible numbers, and in these days they were also found in country where they could be ridden and speared, and this was frequently done but is no longer a recognized method of hunting, chiefly by reason of the fact that they are no longer found in rideable country. Their decrease in numbers can be chiefly attributed to their being hunted by white men. Burton mentions that in the first six months of 1864 rewards were paid for the death of 310 bears in the Central Provinces. Nevertheless the country has undergone a certain change during this period, which must be a factor in their economic conditions. The tendency of the open and privately owned forests has been to become more open, and the tendency of the fire protected government reserves has been to become denser. In addition, it is probable that many of the jungle products on which the bear depends, and for which man is also a competitor, are now more thoroughly harvested. These factors would all tend to increase the bear's difficulties in obtaining food, and even if shooting were to cease entirely, it is extremely doubtful if they would ever again become as numerous as they have been.

Amongst other methods of hunting the bear in past days it is difficult to refrain from quoting from Tickell: "In the extreme south of India among the Polygars of the hills, bears used to be hunted by strong fierce dogs and when held at bay by them the native sportsmen each thrust a long bamboo loaded with birdlime into the shaggy coat of their quarry and thus firmly held their struggling prey," and then laconically adds: "This practice I under-

stand has of late years almost fallen into disuse." Perhaps needless to say any tribe which habitually followed this method of hunting bears in the Central Provinces was extinct before I came to India!!

Although hunting with dogs and spearing bears on foot is not yet entirely a sport of the past it is not a recognized method of hunting in the Central Provinces. To do this one requires powerful dogs of high courage in order to bring the bear to bay. The bear attempts to defend himself chiefly with his paws, and in approaching to spear, it is necessary to advance from the side, and to choose one's moment when the bear is thoroughly engrossed. The first occasion on which I attempted to spear a bear on foot with dogs I foolishly made a frontal attack, and the bear with a swift motion of the paw slipped the spear and got inside my guard. My next attempt, although more successful, the spear getting home, only resulted in the shaft being broken, again by a sweep of the paw. On both occasions luckily for me the bear was already wounded and having profited by this experience under favourable circumstances, I never again attempted a frontal attack. Dogs in attacking a bear have less difficulty in controlling the fight and are subject to less danger than if laid on to a boar; there is nothing in the bear's attack equivalent to the boar's charge; the bear fights at stance.

The great majority of bears are shot on chance encounters while stalking in the morning and evening. They are also procured in chance beats, or are located in a particular piece of jungle and then beaten out. In beating them out the same principles as those recommended for tiger should be followed, but it is more necessary to hit off their natural line of retreat

than in the case of tigers, and less dependence can be placed on the stops. Unlike the tiger, the bear if stopped cannot be induced to lie up or slink back into cover, and there think out the line of apparently least resistance. When once roused he continues to move steadily on, and to "stop" the bear is to accelerate his speed. Assuming that he still maintains his original intentions as regards his line of retreat, he can only be diverted from that line for a short distance, and with continued stopping he breaks into a gallop, in which case all control is lost. When stopped for the first time he may also abandon his original intentions and go off at a tangent, in which case it is seldom he will heed the stops on the other side of the beat. When disturbed the tendency of bears is to make for the hills, and if already on the hill to make further up. They are not deterred by a river bed or any difficulties of ground from making straight for their point.

The lamentations of a bear when wounded have already been described, and it is very seldom that a bullet gets home without this being evident. In following up a wounded bear it is necessary to be cautious, as a charge may result. I have even known them charge an elephant. The attack, however, is badly conceived and the animal is an easy target. Unlike other animals when broadside on they do not present a good target, and one is liable to miss or merely wound. This is due to his flat-shaped body and the large "outer" which merely consists of hair. There is one more point in connection with firing at a bear that must be mentioned. It is not uncommon for what appears to be "the father of all the bears" to appear, and the inexperienced sportsman sweeps a cub from off her back doing no damage to the

mother, and often getting a most vicious charge in consequence. The hump, and apparently low position of the bear's head, will always indicate to those who are observant and have already encountered a she-bear with cubs, what the position of affairs is.

✓ <Bears, when wounded, prove the extraordinary strength and vitality with which they are endowed, and will struggle on to a great distance in order to make good some favourite cave, even labouring under wounds which no other animal would endure. Owing to the long hair which not only absorbs the blood but becomes matted over the wound, the blood spoor often gives out. It is a common belief that they will even apply mud and leaves to staunch the wound. Being unable to endorse this without more definite evidence, I can only say that I have seen leaves and mud on a bear's wound which could only have arrived there under most fortuitous circumstances if these were to be ascribed to mere chance.> Be this as it may, a wounded bear should be followed immediately so as not to increase the difficulty of following the spoor, and if the bear's refuge is known to the hunter, it will repay him to make straight for that point allowing his men to take up the spoor which they will readily do if armed. Nor is the danger so great as to make this procedure "unsporting."

✓ <Another habit of the bear when wounded must here be mentioned. If accompanied, which is not uncommon, the wounded animal makes a savage assault on his companion if the latter happens to be near at hand. Lydekker, quoting from Sanderson, ascribes this habit to "the affectionate but ill-timed solicitude" of the unwounded companion who rushes to ascertain the cause of the uproar, and the wounded

animal, not being in the best of humours, assaults the would-be comforter. This does not agree with my experience, as it is the wounded bear which rushes upon his unwounded companion, and then only when the two bears are close together when the shot is fired.

《Having frequently observed bears at play, I can definitely assert that their idea of a "piece of fun" is of the roughest nature; would shame any courting coster, and would certainly result in police court proceedings. I firmly believe that the wounded animal imagines that he has received something from his companion which "is quite beyond a joke" and outside the pale of bear "cricket." The result is an intemperate counter assault and a *mélée* ensues. These assaults are so commonly witnessed, that the choice in the interpretation of the reason for their occurrence, can be left to those who have witnessed them.

On one occasion I saw four involved in a quarrel of this nature. A beat was in progress and I was guarding a fairly narrow deep track leading out of a nala. I was placed flanking this pass: a bear appeared and I promptly hit it in the ribs: as promptly, it turned and savaged a bear which had been masked by its body, and which I was not aware of. Both disappeared downwards and towards the nala and became unsighted owing to the increasing depth of the path. The noise was appalling, and in a few seconds a seething ball of fighting bears rolled down the path into the nala and into view. Four rounds of rapid magazine fire into the mass resulted in a "Sabbath calm," except for one wounded beast which made straight back through the beaters. There were three dead bears stretched

out on the nala bed. The initial quarrel had thus involved all four.

Another method of killing bears is to "sit up" for them. This may be over a cave or a favourite drinking hole—the latter is a sure method in the hot weather but now rightly discountenanced, as to be effective water has to be scarce, and the procedure entails much hardship on many other animals. To sit up in a ripe fig tree which they are in the habit of visiting nightly has no such effect. Bears habitually go from tree to tree in a regular order, and if the hunter can ascertain whence the bear is coming, and which trees are at the commencement of the sequence, he will conserve his supply of patience. The same procedure may be adopted when the mohwa is falling, but at this season what affords better sport is to stalk various groups of mohwa trees in the moonlight about an hour after dark. Bears can then be seen and approached; they seldom decamp on the first alarm which is often indicated by the bear sitting up, and if not already sufficiently close to shoot, which is seldom the case, the hunter should halt and imitate the bear's attitude: as a rule the bear continues "his lawful occasions" and can then be approached within shooting distance, the same manoeuvre being repeated if necessary.

Yet another method of killing bears, and a most successful one, is, after having ascertained their retreat or even the path by which they retreat, to station oneself at dawn so as to intercept them. This method is very effective where bears frequent a regular line of hills by day and are in the habit of foraging in the plains below by night. Bears can also be procured by visiting their lairs during the daytime. The dislodging of the bear is however often attended with

much difficulty. If it is possible to attack with dogs from both sides, the bear can generally be induced to break, but it is seldom that the sportsman is accompanied by dogs of sufficient calibre to effect this. Moreover, if the bear can protect his rear, either by a rock or another bear, the best of dogs will not effect their purpose.

Failing dogs, a lure can be dangled in front of the cave, and the animal's interest gently aroused. In stimulating the bear, it is better to avoid touching the pebbles or rocks which are hurled into the den, so as to keep them as free of scent as possible. A large thick leaf can be used to shield the hand. If the bear's interest is once aroused, he will attempt to "gaff" the lure with his paw, and seize it in his mouth. In order therefore to coax the bear out so as to admit of a shot having a reasonable chance of success, the lure should be tied on to the end of a bamboo, and played before him just out of his reach. The man playing the lure is of course stationed above and is seldom in a position also to take the shot. The gun is placed so as to see into, and cover the mouth of the cave. Failure to observe the above precautions once resulted in the bear seizing my lure in his mouth. I was dangling for a friend "from hand," and without a "fishing rod," standing on a ledge about 5 ft. above the mouth of the cave, and the bear seized the lure in his jaws as I had no means of keeping it away from the mouth of the hole. On this occasion the handiest lure happened to be a Forest guard's "paggari" and loth to abandon the same, the bear was played for some time much like a salmon, until "he broke." In the process, a hurried and rather hopeless shot was obtained, and then nothing would induce the bear to move. After being unsuccessfully disturbed in this

way, there is no rule as to when they will shift their quarters: it may be almost at once, or it may be after it is pitch dark.

Fire conservancy in the protected State forests limits the use of fire in dislodging game, but it sometimes happens that a bear is located where such means are admissible. On one occasion an amusing incident occurred in trying to smoke out a bear. The scene of operations was a dry waterfall. The action of the water operating for ages had tunnelled a gallery commencing some distance above the edge of the fall, so that in the rains part of the stream flowed through this gallery and escaped at the base of the cliff. The whole of the bed of the stream now dry, was a mass of huge boulders and the entrance to the tunnel was almost vertical and somewhat like a funnel. Dogs having failed to dislodge the bear the obvious plan seemed to be to station my friend to guard the exit below, and to heave burning sticks and grass into the funnel. Almost immediately after doing this, a hyena broke but there was no sign of the bear, so fresh fuel was added with the result that a terrific noise, and much rumbling and roaring arose, apparently from the bowels of the earth, the fire shot upwards, and a large bear smoking and singeing all over burst out through the flames. Apparently he was too bulky to use the exit which the hyena had availed itself of. The bear was in a state of fury I have never seen exceeded by any animal. There were a good many natives about perched on various boulders whom he "went for bald headed." These promptly decamped or collected behind me. After a fruitless chase round the bear seemed to realize that I was the author of all his troubles, and gave me a splendid charge but was easily disposed of. Pity

would be felt for most animals who found themselves in such a "fix" as this bear was, but the comic element in the bear's character and mannerisms, deprived him of the sympathy which was his due, and instead of being pathetic, he was merely ludicrous.

NOTE

The brief reference on page 16 to the bear's method of attack needs amplifying to some extent. Bears bite freely but it has been my experience that they bite chiefly when wounded or when the attack has been "provoked." Sufficient emphasis has perhaps not been given to the fact that it is in the cases of "unprovoked" attacks that the claws alone are chiefly used.

CHAPTER II

THE WILD-DOG

Few animals present a more interesting study than the wild-dog, not only on account of the scanty information so far published regarding his habits, but also, by reason of his extraordinary resemblance to the domestic animal. In spite of this resemblance, science declares that although the tame and the wild species have undoubtedly at some period had a common ancestor, it is impossible for the domestic dog to be a direct descendant of the wild. In the latter there are only two true molars on each side of the lower jaw, whereas in the domestic animal there are three. In all cases hitherto observed in the evolution of a species, although a tooth may be lost, a new one is never acquired or replaced. In order therefore to make out a case of direct descent, it is necessary to assume that the dog which remained wild lost his tooth subsequent to his being tamed, and that the tame animal did not. There are other structural differences, notably in the skull, and the number of mammae, and the tendency has been that the more they are studied, the greater the emphasis placed by scientists on the wide difference between the genus *cuon* and *canis*. Nevertheless it is considered that the last word on the subject has still to be said.

Be this as it may, there is probably no animal, even the wolf included, which more nearly resembles the tame dog in his character and habits, and it is no

exaggeration to say, that in the event of the tame dog taking to the jungle we would expect its conduct to be in most respects exactly similar to that of the wild animal. The literature concerning this animal is scanty. > Lydekker, in his *Great and Small Game of India*, appears to have borrowed largely from Blanford's earlier publication, and apart from adding practically nothing to our knowledge of the animal, has actually reproduced some errors. In addition to these works, information regarding the animal is confined to casual references in books on sport, and miscellaneous correspondence in the *Bombay Natural History Society's Journal*, or *The Field*, and periodicals of this nature.

In what follows it will be noted by those who are interested in such matters, that my observations, and the deductions to be made therefrom, do not, in some respects, agree with what has been hitherto published about this animal. With regard to this it is well to remind the reader that the wild-dog has an immense range. He is found so far north as Ladak, along the Himalayas, throughout the India Peninsula, Burmah, and even the Malay Peninsula, if that is to say, we include the Malayan dog as being only a variety of the same species. This point has not yet been decided. It is only natural however that so widely distributed an animal, existing under such varied conditions, should also vary in some of its habits, and what is true in one part need not necessarily apply elsewhere. The observations on which this chapter is based were made entirely in the Central Provinces, and apply to the central part of the Peninsula.

In appearance the wild-dog is a uniform red, shading into yellow or dirty white on the belly. The points of the hairs along the dorsal ridge are often black. The

ears, which are pricked, are frequently pointed black. The tail, which is short (about 8 in.), has a bushy tuft of black hair some 5 in. or 6 in. long at the end. There are generally a few grey hairs in the middle of this black tuft, and it is not uncommon for these hairs to be sufficiently numerous to amount to a small white tuft within the larger black tuft. Lydekker's description, which is copied from Blanford, states: "Terminal portion of tail black (very rarely the extreme end is whitish)."

Having certainly examined over 100 dogs, it is not considered that this description is accurate so far as specimens from the Central Provinces are concerned, the existence of the white tip being much more common. When quite young, the pups are a uniform sooty brown. Emphasis has been laid on the profusion of hair between the toes. Personally I have never seen sufficient hair to be worthy of special remark. The spoor can only be confused with that of the tame dog or a young hyena, but can be recognized by being longer and narrower, the two fore toe pads being thrown forward. The shape of the body, with a small waist and deep chest, and the legs and their mode of attachment, are built for speed on the lines of a greyhound. The neck however is powerful, and the jaws are massive and deep on the lines of a bull terrier. The wild-dog is thus furnished with the means of running down all but the swiftest, and is further equipped with the power to destroy all but the largest of animals.

An average full-sized dog stands 22 in. at the shoulder and weighs 43 lb. Bitches are $1\frac{1}{2}$ in. shorter and 5 lb. lighter. The weight given by Blanford is 27 lb. and was taken from a very thin animal which had been in confinement.

✓ Their method of hunting varies according to cir-

circumstances, i.e., the nature of the terrain, the animal pursued, and the size of the pack engaged. Single dogs will be met with, but these are generally in touch with a female and litter. Any number may be found together up to a pack of about forty animals. The largest pack I ever saw consisted of about this number. It was in April, in the Chanda District, and the whole pack was in the dried-up bed of a Tank in the jungle: some twenty full-grown dogs lying and sitting around gravely contemplating the gambols and mock combats of about an equal number of half-grown youngsters: a fascinating spectacle which was enjoyed for half an hour, when failing light made it expedient to interrupt the performance.

The tendency of the animals is to congregate at this season, and large packs are more commonly met with in the hot weather and rains, and, although cubs will be found at all seasons, the great majority are born in January and February.

Some two months previous to this, packs are apt to dissolve into couples who stick together until the young family is fitted for introduction to the pack. The sexual act, as well as all the other performances of nature, are exactly similar to those of the tame dog. Unlike the tame dog however, there is very strong reason for believing that the bitches are not promiscuous, and that the animals pair and select their mates some time before intercourse takes place. The attachment of a mate is a necessity to the bitch when she whelps, and it will readily be seen that anything in the nature of promiscuous intercourse would militate against this. Possibly domestication, and conditions which no longer necessitate a mate, have resulted in the abandoned morals of the tame dog. On the other hand, it is necessary to add, that jackals are promis-

cuus to a considerable extent, and one fails to see how a mate is any less necessary to this animal at the time of whelping, than to a wild-dog. It can be partly accounted for by the fact, that jackals more habitually go in couples, and are less addicted to forming packs, and that the female can count on finding a mate when required.

A cave, a shelving rock, or a disused earth, suffices for a lair, and from four to five pups are born at a time, three being a very common number accompanying the parents. The number of mammae possessed by the mother admits of a larger number of young being suckled and occasionally a larger litter may be whelped. I have never known the dogs construct an earth, but they will modify an existing one to suit their convenience. The statement has been made that a colony will breed together: this is conceivable where the number of suitable breeding places is limited, but I have never known of a case in the Central Provinces.

The period of gestation is not known, but it is probably nine weeks. In the early stages the cubs are fed on the mother's vomit, but development is rapid, and they soon accompany the parents to the kill. Lydekker, quoting Mr. Wilson, refers to their driving their quarry to the lair before killing. This has never been observed, and it is considered extremely doubtful if the dogs could impose their will to this extent on the hunted animal; moreover, as the usual method of conveying food to the young is inside the mother's stomach, the convenience of having the kill close at hand is less important.

It is a curious sight to witness the arrival of the whole family on a fresh kill, and the frenzy of delight displayed by the youngsters at the smell of the blood.



VULTURES AT A WILD DOG'S KILL.

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Even at this early stage however, the titbits, i.e. the flesh on the ribs, are reserved for "papa," and any encroachment is met with a growl, and propitiated by a "fawn," just as in the case of tame dogs. The young pup's life is a hard one. There is singularly little affection in the composition of a wild-dog. His is a hard nature, and the callous indifference they show when death or a wound overtakes a companion is remarkable. It is true that he seems to expect no sympathy, and unlike the tame dog, they will endure the most frightful wounds without uttering a sound.

Without caring to lay down the rule that they never hunt by night, it is true to say that practically all their hunting is done by day, often in the morning. Their usual method is to take up the scent of an animal and run it. When these fiends have once seriously decided on this, the animal is doomed. I say "seriously" as they will sometimes rush an animal a short distance for sheer frolic. Mr. Ware has described what was evidently an incident of this nature in Vol. XXIII, No. 3, of the *Bombay Natural History Society's Journal*. When not hunting, they do not appear to create the alarm amongst the other animals which a tiger or a leopard does, and at no time do they receive so much attention in the way of cries from monkeys, deer, or peafowl. It is a matter for speculation as to whether this is the result of the animals realizing the futility of issuing a warning against an animal that runs by scent. It is also curious how the other animals seem to know instinctively when a dog is harmless, and not hunting, and sometimes how little fear they show. We have an analogy of this in the similar knowledge displayed by birds, who are aware of a hawk's intentions, and ignore or even

mob him when he is not hunting. When running, they seldom force the pace, seemingly conscious of the fact, that sooner or later the animal will be brought to bay, and so it is: often in a pool of water. They seem to be able to tire out all the jungle animals without effort.

If the pack is large, one or two dogs take up the running and the rest lie behind. They usually run mute, but will "open" to assemble the pack, and the leaders, especially in long grass, give short, sharp "yaps" to indicate the line, when necessary. On the animal coming to bay, their usual method of killing is to launch themselves on its head, seizing the ears, eyes, nose and lips, hanging on like leeches, bearing down the head, quietly waiting, and never letting go until the end. If the animal is in deep water they swim out, and seize it, even crawling along its back to do so. Apropos of this it may be interesting to note that the wild-dogs under such circumstances do not always acquire undisputed possession of their kill. Deep water often means crocodiles, and the author once came on a pack of wild-dogs in a state of extraordinary excitement, chattering on the bank of a pool, their kill having been annexed by a large "mugger," who was lying beside the dead sambar, quietly contemplating the impotent fury of the animals which had killed the deer. Col. Hendley, I.M.S., when civil surgeon of Hoshangabad, once witnessed a similar scene, but on this occasion the dogs were silent. The fact that I have several times found wild-dogs inside crocodiles indicates that on such occasions the crocodile does not always content himself by merely annexing the kill. It is believed that no other animal does kill and eat a wild-dog.

On one occasion it was my fortune to witness th

death of a large sambar stag at the instance of only two dogs, and the method employed was different from that previously described. In this case the stag had not been brought to bay, and the dogs were springing at its flank, endeavouring to seize the soft skin on the belly behind the last rib. This they eventually succeeded in doing, when the stag's entrails rapidly appeared, furthered by the motion of the galloping animal. It is possible that where only two dogs are hunting, and a satisfactory bay more difficult of attainment, this method of killing may be common: it might also be employed by a hungry pack impatient for meat. The story to the effect that they are in the habit of emasculating the animals they attack can be discarded. In long grass the pack will often surround a small deer, and keep in touch with it by leaping, just as a collie hunts a rabbit in corn.

After killing they commence to tear off the skin and flesh on the ribs. It is believed they eat nothing but flesh, skin, hair and bones: no vegetable matter common in the fæces of other canidae has been observed in that of the wild-dog. The dung consists of hair and bones glued together by the tarry-like substance that results from a purely animal diet. Macmaster has recorded that an animal he kept in confinement ate grass with apparent relish. This was probably due to some intestinal derangement. If two animals are bayed together, both are killed, although one may be all they require. As dogs are very liable to appropriate another animal's kill, it is very necessary in observing their habits to be certain that the dogs actually did the killing, and it is considered that failure to do this as led to a certain amount of confusion regarding their habits. I have never known them remove the bones, or attempt to hide the carcass in any way,

but have found dogs on a leopard kill when both these operations had been performed, of course by the leopard. Normally the dogs do not look upon the kill as more than one day's meal, and high or contaminated meat is distasteful to them. The kill is therefore nearly always finished by vultures. This is in contradiction to the habits of the tiger, and results in the wild-dog being by far the most destructive pest in the jungle.

They occasionally kill cattle, goats, and even tame buffaloes, but their food chiefly consists of sambar, nilgai, swampdeer, chital, pig and all the smaller jungle deer and antelope. I have never known them run the plains-loving antelope, i.e., black buck and chinkara—the wild-dog is essentially a jungle animal. I have never heard of them attacking bear or bison, but I have no doubt the latter are sometimes killed, and there is a Burmah precedent for this. They respect hyena and jackals as being blood brothers. They will attack both leopard and tiger, not with the object of obtaining food, but as the result of a quarrel, or for the sport of bating these animals: the dignified tiger with his love of seclusion being a special butt. These remarks naturally bring us to the much-debated question as to whether they have ever been known actually to kill a tiger.>

Stories to this effect are current in most of the wilder districts of the Province, and the jungle people who tell them are generally truthful and accurate in matters of this nature. < Although I once witnessed wild-dogs annoying a tiger, I have never seen an actual fight. It was my fortune however to arrive in a jungle village three days after an occurrence of this nature. The villagers' story was as follows. A tiger had killed when a pack of wild-dogs happened along, or

possibly they had been running the sambar and driven it on to the tiger, who killed. The noise of the combat was heard in the village, and it was said that the dogs disputed the kill with the tiger, who was in actual possession. Some hours after peace had reigned, the villagers timidly approached the spot, and found a dead tigress and two dead dogs. The remains of the skins were produced and shown me. The evidence in this case would certainly have been sufficient to convict a man of murder, and I do not think there can be any reasonable doubt that they do occasionally kill tigers.

The chief argument against credence in stories of this nature is the difficulty in imagining how so formidable and massive an animal as a tiger could be killed by wild-dogs, no matter how numerous. If the tiger is to be killed and not merely annoyed, it is necessary for his enemies to come to close quarters; and one would imagine that before any serious impression could be made on the tiger, the dogs would be annihilated. Having myself on several occasions bayed a tiger with a pack of tame dogs I can testify to the bewilderment of the tiger, and the difficulty he has in protecting his flanks when thoroughly engrossed in front. It is probable therefore that he is gradually disembowelled.

There is another most important factor in the case namely, the mental one. The tiger is not accustomed to be attacked by anything; he has no recognized method of defence, he is bewildered, thrown off his balance, and mentally benumbed by the novelty and the indignity. The mentality of the animal at the time of attack often decides the issue. Nature has many examples of this, even the tiger himself is accustomed to exercise the mesmeric influence of his terrible

presence on the deer he stalks, and we are all familiar with the hopeless apathy of a rabbit when confronted with a stoat. It is more than probable therefore that the tiger when attacked by wild-dogs does not do himself justice, wastes his strength, and puts up a very "poor show." That dogs will always attack or annoy a tiger cannot be maintained: much depends on the number of the dogs, their temperament at the time, and the circumstances of the encounter.

On one occasion I was sitting over a tiger kill, three dogs approached and seemed thoroughly conscious of the fact that they were reaping when they had not sown. They ate freely, but watchfully. One had an ear and part of his face missing from a bullet I had fired two days previously, and whether this fact had any influence on their behaviour or not it is impossible to say, but on the approach of the tiger being heralded by the "swearing" of monkeys, the dogs at once departed, silently and rapidly. "Conscience makes cowards of us all," and I doubt had the kill belonged to the dogs by right, whether they would have given way—at any rate without a protest,—and it is probable they would have molested the tiger before he had approached close enough to be aware of a cheap dinner in the offing.

Wild-dogs possess sub-anal glands which give off a distinctive odour. Stories regarding their being able to eject a fluid, or using urine for the purpose of confounding their quarry, are interesting myths, which may have possibly arisen through the fact that when wounded and pursued they will sometimes through fear lose control of their functions and so wet or defile their tails. Anyone who has kept dogs is familiar with what sometimes happens when a puppy gets its first thrashing.

The dog's relations towards man are peculiar, and for so wild an animal he shows extraordinary boldness, and will sometimes remain stationary staring at one, even after some of his companions have been shot : he frequently gives way with reluctance and when he does so, soon pulls up again, in fact they will sometimes behave as if they meditated an attack. I have never known of a case however in which a man has been killed, and I have only heard of one case in which a man was regularly attacked. This was reported to have occurred in the Khandwa district. The impression they give is, in my opinion, the result of a bold nature coupled with intense curiosity, and their conduct is not prompted by thoughts of aggression. That they are intensely curious is undoubted, and they can be induced to leave the shelter of the jungle and expose themselves on a road or a fire-line by an unusual noise—such as tooting on a horn ; or imitating an animal in distress, as mentioned by Best.

Their attitude towards the domestic dog is still more curious. If large dogs, of sufficient size and courage to put up a fight are slipped on them, they will retreat, but if closely pressed they will turn and fight. I have had a powerful pack of savage dogs driven right up to my feet by their wild confrères, who then retreated at their leisure in spite of my pumping lead into them. If fox terriers which are too small to be aggressive are laid on to the wild dogs, they approach, and attempt to fraternize : fawning and gambolling and playing with them. The tame dogs, fearful lest this play should develop into horseplay, retreat to one's feet, bringing the whole pack with them. The wild-dogs seem to lose all sense of fear, and I have shot them under these circumstances at three yards from the muzzle of the rifle. Even after being scattered by the shooting they will

again return in company with the tame dogs. On two different occasions in the Melghat I shot six dogs running out of two different packs in this way. These circumstances are the only occasions on which I have felt any compunction in shooting a wild-dog, but after their determined efforts to fraternize with one's own pets, it seemed to me as if their poor wild brethren were anxious to raise their status, and acquire in their ignorance some of the supposed arts and blessings of domestication.

It has been asserted that wild-dogs do not bark in the true sense of the word; this is probably true; the nearest approach to a bark emitted by them is the "yap" they occasionally give when running an animal. They both whimper and whine. Galloping round a corner once, I came suddenly on two old dogs and a cub, the latter made off "screaming like a puppy." They growl and snarl and also wag their tails to show pleasure or to try to please. The commonest call is a sort of chattering, which is analogous to the "chuck chuck chuck" of the Indian fox. In addition they possess a mate call, which, although seldom heard, can never be forgotten. Written language is a very poor medium for describing sound, and one's only means of doing so is by comparison with some other sound. The mate call is analogous to the wailing of the jackal, and is of the same nature, but with less cadence, not so prolonged, much louder, and ends more abruptly. The timber drag paths of the Melghat are ideal for purposes of spooring. On several occasions I have known this call given at dusk by a dog sighting the camp from an adjacent hillock. The call was answered, and acted in the nature of a summons to his mate, to come and view the unwonted intrusion. I am inclined to think

that this call is only used when two dogs have mated and separated from the pack.

When caught young, the puppies can be readily tamed, and will follow their master about. I know of no case however in which they have been kept as pets until mature. The head servant of Mr. Blunt, Conservator of Forests, had two cubs which ran about loose, and were extraordinarily tame. The Government reward for cubs is Rs.5, and for mature animals Rs.15. The servant's intention was to retain them until they had matured to the value of Rs.15, when they would be killed and the skins and skulls presented at the Treasury for reward. This man was a financier and anticipated "The War Saving Certificates." I cannot say what eventually happened to the pups, but under the circumstances it is unlikely they survived a minute after they had matured financially: this would be long before they had become mature adults.

There is no recognized method of hunting wild-dogs. They sometimes come out in beats, but more often one happens across them while stalking, or on the march. They are fond of frequenting jungle roads and fire-lines and river-beds. They certainly drink once a day, if not twice. When in packs they move about from place to place every few days, unless the game happens to be sufficiently numerous to support them longer.

Sometimes news of a kill is brought in, and it is not mere coincidence that the kill often takes place near the camp, as on more than one occasion I have known a sambar run right into the camp for protection, the fear of man being overcome by the greater terror. Everyone familiar with nature must have witnessed the analogous behaviour of a small bird

when a hunting hawk was about. When pursued by dogs the sambar will even look upon man as his best friend, and it would seem as if they were conscious of the fate in store for them.

In connection with this I may relate a scene I once witnessed, and although tame dogs were involved, the incident might equally well have happened in the case of wild-dogs. In a small peafowl beat at Kolkas in the Melghat, two fox terriers ran a full-grown doe sambar into a deep pool, swam out, and mounting its back, which was flush with the water, crawled along and attacked its head. The deer was defenceless. In order to save it, two Korkus and myself waded out and dispersed the dogs. The sambar allowed us to handle it, and with infinite care we coaxed it ashore, where it continued to stand between us, and one of the Korkus actually started to rub it down. It was in no way hurt. It is only fair to add that it had a fawn on the hillside close by. I do not ascribe its behaviour however to maternal solicitude, but to the fact that its faculties were benumbed by the terror inspired by the dogs, and that it preferred our, or any company, to theirs. We had considerable difficulty in getting it to move away to the forest. It is also necessary to state however that sambar do not always behave in this way, as will be seen in the chapter on Sambar.

In obtaining news of a kill it is important to visit the scene as soon as possible, as the dogs have a habit of eating and moving off, and if once the vultures have arrived, the dogs may never return. In approaching the kill choose the most commanding point, as it is often possible to shoot several before they move off. In doing so it is necessary to study the wind, as although the scent of man will not stampede them, it will cause

them to move into cover. After the shot they should also be followed up rapidly, as they often halt or hang about and it is sometimes possible to get three or four in this way before they finally decamp. There is no really efficacious way of dealing with these pests. The raising of the reward was responded to, to a certain extent, by more being killed by native shikaris. It was also responded to by a regular trade in faked skins, and in some districts at any rate, no rewards are paid except on skulls as well, these being unmistakable.

Poison can be used with great effect, but its use is confined to Europeans. The *modus operandi* is to make an emulsion of strychnine, get to the fresh kill as soon as possible, even driving off the dogs without shooting. Slash the ribs with deep cuts longitudinally and then vertically, and partly detach the small squares or mouthfuls thus formed. The dogs prefer the flesh on the body, and they tear off the meat in lumps and swallow these whole. The idea is to create a number of convenient mouthfuls that can be easily detached and rapidly swallowed. Stick a knife into each mouthful, and put in some of the emulsion and close the wound. Go in the evening or next day and search the surrounding jungle for corpses. It is important not to use too much poison, as an overdose may result in the dog immediately vomiting and thus discarding the poison. In poisoning carcasses the greatest care must be taken to warn the surrounding people. Even this is not always sufficient, as on one occasion a band of villagers, having been made immune by a local "Boomka" or "Priest," removed a quantity of poisoned meat. Luckily I heard of this in time, and overtaking the men before they had reached their homes, prevented a horrible catastrophe. If there is any chance therefore

of anyone going near the kill, a guard should be stationed so as to prevent the meat being taken.

It occasionally happens in the hot weather that a pack of dogs will regularly resort to the same pool to spend the day. In this case a goat should be injected intravenously with the emulsion: it will drop dead almost at once: the carcass should then be placed near the water. I once poisoned a whole pack in this way. It is not considered that these methods could do anything towards seriously affecting the numbers of the dogs in the Provinces as a whole. They would merely have a beneficial effect on the particular locality.

That the number of dogs is liable to serious fluctuations I am thoroughly convinced, but the causes of this are processes of nature outside our knowledge. When I first went to the Province in 1899, and for some years after, wild-dogs were not nearly so numerous as they subsequently became. It is of course exceedingly difficult, nay impossible, to be certain that there actually were more dogs. It is only possible to say that one came across them much more frequently. I am also of opinion that after this rise in numbers they have again commenced to decrease. The only direct evidence bearing on the subject which I possess rests on the authority of Mr. Kenny and has reference to the Sembadoh Range of the Melghat. During the rains in this tract wild-dogs in broad daylight entered villages and bit cattle and at least two human beings. The theory was that the dogs were mad, but the persons bitten recovered and it was reported that a number of dead dogs were found at the time of these occurrences. The very large decrease in his kinsman the wolf is an undoubted fact which cannot be adequately explained. Wild-dogs nevertheless are still numerous throughout

the Provinces, and are to be found in every extensive jungle, either permanently, or at times, and although everyone would like to see their numbers reduced, the naturalist need have no fear of this most interesting animal being exterminated.

CHAPTER III

TIGER: DISTRIBUTION, SIZE AND HABITS

The tiger is the most important animal in India; in fact, it is not going too far to say, that associated in the mind of the sportsman with the mention of the word India, is the thought that it is the land of tigers. No excuse is therefore needed for dealing with this animal more generally, and for not confining myself to its Provincial aspect.

Tigers are very widely distributed. They are found as far west as the Caucasus, in Northern Persia, in many parts of Central Asia, Manchuria, Mongolia, China, Korea, India, Assam, Burmah, and the Malay Peninsula as far south as the Island of Singapore. Colonel Count Nieroff of the Imperial Guard, St. Petersburg, who had done much big game shooting in many parts of the world, told me that tiger, which he had hunted, were much more generally distributed in Siberia and Central Asia than was generally supposed, and that they are often found in reed beds along the banks of rivers. The same might also be said of China, and I have been given a similar impression as to its distribution in this country by persons in a position to judge. The fact that tiger shooting is not regularly indulged in except in India tends to create the erroneous impression that Manchuria, India, Burmah and the Malay Peninsula have more or less a monopoly of this animal.

As is to be expected from an animal with so wide

a distribution, tigers can accommodate themselves to a variety of conditions, and they are found in India in dense forest, scrub and grass land. Apart from food, the two essentials to their distribution are a sufficiency of water, and means of procuring shade from the sun, of which they are very intolerant. Except in Baluchistan, Sind, and parts of the Punjab and Rajputana, suitable conditions are met with throughout India, and save in such localities in which they have been shot out, tiger are still found all over the Peninsula, and for some distance into the Himalayas. Tigers however have not penetrated into Ceylon, and it would appear as if they had a large in India after this island was separated from the mainland.

All tigers, wherever found, are essentially the same beast, but vary considerably in type according to the environment in which they live. Those coming from the Caucasus and Persia are generally a small hairy race. The Siberian and Manchurian tiger and those from the Amur are immense hairy animals, much larger than anything now found in India. In Korea such specimens as I saw, compared with the Indian beast, were higher in the leg, had a tendency to have withers, the neck appeared short and did not flow on from the shoulders as in the case of the Indian animal. There was also a depression in front of the shoulders. In size and weight however they were inferior to Indian tigers. As I only saw a few specimens I cannot say if these characteristics are general, but the Korean animal is essentially different from what one understands by the Manchurian tiger.

Tigers found in China and the Malay Peninsula have always struck me as being smaller and having a tendency to be darker than Indian tigers. In India

itself, although individuals vary considerably in size and colour, there is no consistent variation in any particular locality. Animals from the south of the Peninsula probably average somewhat smaller.

While the Central Provinces produce animals fit to take their place with any in India, Sir John Hewett and others qualified to judge, consider that Bengal and Terai animals average somewhat larger. These areas are mostly covered with sal forest, and it is significant that the tigers from the sal forests of the Central Provinces average larger than from the mixed forest woods. Those familiar with both have informed me that the Central Provinces animal is more truculent and charges more readily.

There is very good reason for believing that tigers have not been long in India, and that the trek from Central Asia southward is of comparative recent date. Col. Stewart has pointed out in the *Proceedings of the Zoological Society of London* that there is reason to think that the users of the Sanscrit language, when this was spoken, were not acquainted with the animal as there is no Sanscrit word for tiger. We would also gather from Marco Polo's travels that when he was in India the lion was hunted and that in his days this was the commoner animal of the two; and although he refers to tigers, it is not in connection with India. The lion habitually lives in more open country than the tiger and the former animal would be much more in evidence and more easily hunted. Where both animals existed in the same tract the more powerful animal, viz., the tiger, would debar the lion from frequenting forest tracts, and this no doubt was an important contributory cause to the disappearance of the lion from Central India.

We have already mentioned that they have not

penetrated into Ceylon. In addition, they have not yet become acclimatized, and suffer considerably from the heat and are still unable to walk in the sun over bare ground during the hot weather without serious discomfort and even damage to their feet. I have seen a tiger's pugs completely blistered by his being forced over bare trap rock in May. In addition to this, the woolly nature of the cubs when born give one the impression that they are equipped for a cold climate.

Central Asia has witnessed important emigrations of the human race, and it has been suggested that these were contemporary with the sudden and large shrinkages in water level which we know have taken place from time to time. The animal kingdom was also bound to be affected. I can testify to the fact that some of the country now occupied by the Manchurian tiger appeared to contain no animal of large size, and this is probably true of much of the country he inhabits and it is inconceivable that this huge tiger should have been evolved save to deal with animals of this nature. It is only recently that the mammoth became extinct in Siberia. I do not know if any remains have been found, but it seems certain that at one time Siberia must have been tenanted by herds of large oxen on which the tiger lived; we cannot otherwise explain his development. Whether due to disease or climatic reasons or the change in water level or a combination of all three we cannot say, but certain it is, that the tiger's main source of food disappeared and in consequence his exodus to other parts of Asia took place.

It is necessary to examine how the change from Central Asia to India would affect the tiger. It may be assumed that when he first entered India he

was much the same as the present Manchurian variety. Records of Manchurian tiger are scarce, but it seems probable that 12 ft. tigers still exist in parts of Northern Asia, and when these first entered India they must have been very much larger than the present Indian tiger; so large, in fact, that not only would their bulk be unnecessary in order to deal with the most of the animals they preyed upon, but in the Indian jungles this bulk would be a positive hindrance to them. The change into a hot climate would also tend to reduce their size as well as making them shed their heavy coat. These modifications have actually taken place, and the Indian animal of to-day is a smaller, more active, and smooth-coated beast compared with his progenitor. To what extent has this reduction in size taken place, and are there cases of reversion to primitive type? In other words, within the history of sport, has the 12 ft. tiger existed in India?

Few questions have been more hotly debated, and the matter is by no means settled yet and probably never will be. Advocates of the 12 ft. tiger can quote numerous instances from books on shikar in support of their views, but this does not help much, as everything depends on the accuracy of the writer. That a great many were inaccurate is undeniable. Some of the sportsmen who hunted in the Forties of the last century refer to tigers of even over 12 ft. in the most off-hand way. One gets the impression that anything under 11 ft. is hardly worth talking about. In some cases these men were followed a few years afterwards over identically the same ground by others who record nothing but tigers of 9 and 10 ft., animals no bigger than those killed every year in India to-day. Amongst men of this class I may

We have already

mention some mighty hunters with the lengths of the biggest tigers they killed.

Shakespeare	.	.	.	.	one of 10 ft. 8 in.
Simpson	.	.	.	.	two of 10 ft. 4 in.
Nightingale	.	.	.	.	one of 10 ft. 2 in.
Sanderson	.	.	.	.	one of 9 ft. 6 in.
Hamilton	.	.	.	.	one of 9 ft. 3 in.

What happened to *all* the big tigers? Did none survive? Did the first sportsman kill them all? Because we must undoubtedly reject many of these records, are therefore all to be similarly treated? That is the difficulty; to discriminate as to whose measurements are reliable.

Most of the authors whose style and records are most convincing give us nothing sensational. Eighty years ago when sportsmen first began to hunt tiger seriously, one must not forget that tigers were much more numerous than now, and often lived in country where no tigers now exist and which may have been specially favourable to their development. Amongst a great number of tigers the chances of an abnormally large animal occurring are increased. Moreover, their comparative immunity from serious hunting up to this time, gave the tigers every opportunity for the fullest development. In those days tigers were measured round the curves. In a normal tiger this adds 3 in. to 4 in. to the length; in a large tiger it may add 5 in., and the larger the tiger the more it tends to increase the length. To measure round the curves gives great opportunities for increasing the length, so much depends on how often the tape is pressed in.

Anyone familiar with the East, knows well how keen the native shikari and the babu are to "please master," and we are never told exactly how these large measurements were taken. Even given four

or five white men together and getting each in turn to measure round the curves their returns will all vary and some by as much as 3 in. The proper way to measure a tiger is to place it on its back on a flat surface and depress the head, then place two uprights, one touching its nose and the other the tip of the tail—remove the carcass and measure the space between the base of the two uprights. Measurements made in this way will not vary by $\frac{1}{4}$ in. It is only comparatively recently that sportsmen have commenced to measure in this way. Allowing for the extra 5 in. owing to past methods of measurement, although this will bring the 11 ft. tiger down to within reasonable distance of animals still occasionally killed, it utterly fails to account for the 12 or 12 ft. 4 in. beast.

I know of one authentic case of a tigress measuring 9 ft. 6 in. between uprights, and assuming this animal to mate with a very large tiger, and the cubs to have a prosperous upbringing, and taking the Indian tiger's ancestry into consideration, it is impossible to say that a tiger cannot exceed 11 ft. Nevertheless at the present time the announcement of the shooting of an 11 ft. tiger would be followed by a deluge of questions and since the interest of the whole sporting world has been centred on 11 ft. tigers these have ceased to materialize.

The more improbable the event, the stronger the evidence demanded in order to establish the same. It is significant that Jerdon, in his *Mammals of India*, published in 1874, will not accept even the 11 ft. tiger, and he must have known men who laid claim to having killed animals of over this length. While wishing that fuller details had been furnished as to how and by whom the measurements were made in past days. I think we can accept the occasional
We have already mentioned

tiger of 11 ft. measured round curves, but we certainly cannot extend indulgence beyond this. It is hoped that anyone in future killing a phenomenal tiger will furnish the fullest details regarding the measurements. This is specially required in cases of large animals being killed by important personages, to please whom many are only too ready to stretch a point, and such persons are apt to delegate the work of measuring; at any rate they are always surrounded by a staff to relieve them of personal supervision and they are largely immune from the pertinent enquiries of the sceptic.

The weights given in old records are on the other hand often immoderately small, so much so that when compared with the stated length, and assuming that both are correct, the modern tiger is an entirely different animal. Some of these records have been published in the *Bombay Natural History Society's Journal*. In some cases tigers of the largest size are only made to weigh as much as a fair-sized tigress, and it is impossible that both weight and length are correct. Sir John Hewett probably possesses the most extensive records of any living person, covering as they do 241 animals which he has seen shot, mostly in the Terai. He has been kind enough to favour me with some of his figures. The longest tiger he ever saw shot was 10 ft. 5½ in. and the longest tigress 9 ft. 6 in. The heaviest tiger he weighed was 570 lb. and the heaviest tigress 347 lb. Out of the 241 animals nine tigers were 10 ft. or over and ten tigresses were 9 ft. or over 9 ft. One of these was from the Central Provinces.

An exact comparison with animals from the Central Provinces is not possible as the measurements recorded by me were taken between legs and this reduces the

length by 3 in. to 5 in. Another point is that I weighed and measured very few immature animals. The figures I possess refer to forty-two fully mature males and thirty-nine fully mature females, and while I have seen many more mature animals killed than this, I have not got a record of these, and it is probable that in selecting animals for measurement the tendency would be to choose large specimens. Unfortunately some of my diaries were lost or stolen in Bombay. I am unable to say, therefore, exactly how many tigers I have seen shot, but it can be taken as being approximately 200. Out of this number one is of 10 ft. 3 in. and another of 10 ft. 2 in. In addition, there are one of 9 ft. 11 in., one of 9 ft. 10 in., the latter shot by His Royal Highness the Duke of Connaught at Supkar. Another tiger at the same shoot was 9 ft. 9 in. I have another record of a tiger 9 ft. 10½ in. All these six animals, if measured round the curves, would have been 10 ft. or over. The biggest tigress I have seen measured was 9 ft. 1 in. In addition, I have records of two of 8 ft. 11 in., one of 8 ft. 10 in., and one of 8 ft. 9 in., i.e., five animals of 9 ft. or over, if measured round curves. It would seem, therefore, that the occurrence of 10 ft. tigers and 9 ft. tigresses is slightly more common in the Terai and Nepal than in the Central Provinces.

The classification of what is a mature animal has presented some difficulty, and would vary according to the views of the individual. Out of the thirty-nine tigresses selected as mature, the smallest was 7 ft. 10 in. and the largest 9 ft. 1 in. The average is 8 ft. 4 in. and the average weight is 290 lb. The heaviest tigress weighed was 343 lb. The shortest tiger classified as mature was 8 ft. 9 in., and the longest 10 ft. 3 in. The average works out at 9 ft. 3 in. The weights

vary between 353 and 515 lb., averaging 420 lb. for a gorged tiger. I weighed one other animal over 500 lb.

The largest animal I actually ever saw, however, only taped 9 ft. 11 in. between uprights. Most unfortunately, I had no weighing machine and could only make a rough estimate of its weight by balancing it against a number of men, and some of these men left before I could weigh them. I firmly believe this tiger was about 600 lb. in weight. This animal had been living on full-grown buffaloes, and was doing an immense amount of damage. It had killed some of the largest animals, including a bull, with apparent ease. The bulk of its neck may be gauged from the fact that while biting its fore paw, after the first shot, I put in what I hoped to be a "finisher" from a Ross rifle, using the usual copper-nosed bullets. The bullet never even reached the bone, and only stirred the beast up. The line of the backbone was sunk in a depression, and on each side the flesh came out as flat as a table for 8 in. before the curvature of the ribs commenced. In addition, it had what I have never seen on any other tiger. There was a curious wedge, not soft and flabby as one sees in Zoo animals, but a hard firm ridge 4 in. to 5 in. deep running all along the belly from the pelvis to the throat. It was so distinct I thought it must be due to some disease, but it turned out to be merely a strip of pure white fat. Some idea of this animal's size can be gathered from the following measurements:

Length of body	.	.	.	.	.	7 ft. 3 in.
Length of tail	.	.	.	.	.	2 ft. 8 in.
Girth of body	.	.	.	.	.	59 in.
Girth of head	.	.	.	.	.	39 in.
Girth of forearm	.	.	.	.	.	21 in.
Height	.	.	.	.	.	43 in.

The biggest tigress, 9 ft. 1 in., already mentioned, was an old beast and was killed in the same jungle as the above-mentioned monster and may have been his mother. In both these animals the tail was short.

Although the size of tigers varies considerably, the shape does not. The greatest difference is found in the tail, which may vary as much as 15 in., and the length is not dependent on the size of the animal; the longest and shortest tails I have measured were 45 in. and 30 in. respectively.

The height of tigers at the shoulder varies from 36 to 44 in. A good average male should measure 39 in. Other average measurements are 37 in. round the head, 32 in. round the neck, and 19 in. round the forearm.

It will be seen from these measurements that there is nothing lanky about the tiger, and that he is a large, powerful, burly animal, differing entirely in a wild state from the impression one gets from looking at specimens in captivity. In fact, I have seen quarters on a tiger that would not have shamed a polo pony. Tigresses are, of course, much smaller than tigers and generally more sinuous. The appearance of the tiger is too well known to require general description. It will suffice to mention some points which may be overlooked, and a few variations from type.

Lydekker merely mentions that they have "a short ruff on the throat." In my opinion, this statement is inadequate and hardly correct. In their winter coats, old males often have regular "Dundreary whiskers" in the region of the chops immediately below the ear and all have a certain amount of "ruff" on the top of the neck and round the throat which in cold climates

develops into a small mane. In summer the hair is much shorter and paler in colour. In some specimens the white of the belly extends some way up the ribs, thus resembling a colouration more commonly seen in Northern varieties.

All tigers are born with their full number of stripes, and these persist through life, but in old specimens they tend to become fainter. The number of stripes on tigers and tigresses are practically the same, no sex having consistently more than the other. Young tigers and tigresses give the impression of being more striped, but this is merely due to the body being smaller. The impression that some stripes may have disappeared from the shoulders of a heavy old male is due to the development of the muscle and the larger space between the stripes. As one so often sees mounted specimens with pink insides to their mouths, it may be as well to mention that the insides of tigers' mouths are a light whitish olive green, and the tongues are yellowish white or grey but faintly tinged with pink. White tigers occasionally occur. There is a regular breed of these animals in the neighbourhood of Amarkantak at the junction of the Rewa State and the Mandla and Bilaspur districts. When I was last in Mandla in 1919, a white tigress and two three parts grown white cubs existed. In 1915 a male was trapped by the Rewa State and kept in confinement. An excellent description of this animal by Mr. Scott of the Indian Police, has been published in Vol. XXVII, No. 47, of the *Bombay Natural History Society's Journal*.

Blanford, in his *Mammalia*, mentions the occurrence of a black tiger in Chittagong, and this statement is repeated by Lydekker. One cannot help wishing that the evidence on which this rests had been more fully

stated. A large black panther might have been mistaken for a tiger. Col. Burton, in an excellent article on Panthers in Vol. XXVI, No. 1, of the *Bombay Natural History Society's Journal*, discusses black tigers, and accepts this instance as "proven" but rejects other cases. Personally, I have always felt sceptical about this animal. One occasionally hears stories of black tigers, but they are never shot. One cause giving rise to these tales might be that the tiger had been rolling in the black sooty ashes that often result from a jungle fire. Another false impression can be conveyed by caked blood on the tiger.

I once watched three tigers feeding on a fresh kill, and the largest animal which had of course selected the favourite place between the buttocks, managed to get itself smothered in blood, all the visible white being covered. As I was watching this performance, which was in broad daylight, the red of the blood changed to black as it rapidly does, and had I not witnessed this transformation and come on the tigers without being aware of what had happened, I would have been firmly convinced that I had seen a black tiger.

Before concluding these remarks on the structure and appearance of the tiger, mention may be made of the rudimentary clavicle which is found floating in the flesh between the fore shoulder and the base of the neck. This is a small curved bone averaging about 3 in. long, known amongst the natives as "Birnak," and to which they attach great importance as a charm. The youthful sportsman is therefore warned to secure these bones at once, otherwise an interesting souvenir may be lost. The flesh of tigers when cooked and eaten much resembles veal and retains none of the disgusting odour of the animal before skinning.

4. Tigers breed at all seasons, but there are two well-marked periods during which the majority of the cubs are born—one period after the rains in November, and the other in April about the time the hot weather sets in. At the time of pairing, the tiger and tigress are found together. Both Blanford and Lydekker state that the tiger is monogamous: on what grounds I cannot say, as I have often known a tiger to be in "tow" with two tigresses at the same time. Moreover, the number of the sexes is not equal, tigresses being more numerous. The proportion of the two sexes shot is not a correct criterion of their relative numbers, as tigresses with young cubs are often difficult to secure. They frequently return to the cubs during the day and their cunning is developed by maternity.

When pairing, old male tigers sometimes become dangerous; possibly irritated by the resistance of the female who appears to expect a rough courting and often gets it, as the marks on the back of her neck will sometimes show. Another motive prompting aggression may be the desire to "show off" before the female—a common motive in animals, including man.

An excellent instance of a tiger attacking a man owing to sexual excitement happened to a retainer of mine. He was going along a wide jungle road not far from my camp at dusk. A tigress trotted out, closely attended by a big tiger, and went down the road in front of and away from the man. The man halted; but the tiger happened to turn round, and seeing him, promptly charged. Trees were scarce, the only possible shelter being a Salai (*Boswellia serrata*) tree about 200 yards off. The man was being rapidly overhauled, but had the sense to drop

his turban which the tiger stopped to worry. Not satisfied with this, however, the tiger continued the pursuit, and the man just succeeded in scrambling into the tree. The tiger then stood on his hind legs and clawed at the man, but failed to reach him. Both tigers then went into a neighbouring nala and renewed their courtship, the tiger from time to time returning and demonstrating at the man. Meanwhile, the sun went down and the wretched man had to spend the night perched on a limb of the tree in the bitter cold, without food or drink, and most inadequately clothed. At last the wished-for day arrived, and half frozen, he clambered down only to be promptly charged again, barely escaping with his life. He was kept there until nine o'clock, when a cart happened to pass, and shouting to the cartman who replied, the tigers moved off and the poor wretch was rescued. This tiger was in the same locality for a long time after this episode, and never molested anyone, and as I have known of other cases in which they were dangerous at this period, there is little doubt as to the cause of his behaviour in this instance.

< Before the cubs are born, the sexes separate, the tigress preferring to be alone until the cubs have a sense of the fitness of things, and the correct attitude towards their male parent. I have known two instances in which a young male tiger had apparently annoyed his father over the dead buffalo they were eating, and in consequence was killed and partly devoured. I came on another case in which a young tiger had been killed and eaten, in which there was no "bone of contention."

The tigress will drop her cubs anywhere in the jungle, but often selects a rough shelter of rocks or a cave. Any number up to six at a time may be born,

but two or three is the usual number. Best mentions a case in which as many as seven foetuses were found in a tigress. Lydekker states that when two cubs are born they are always a male and a female. This is certainly not so, as I have even known cases of not merely two but as many as three being all of the same sex. The period of gestation is only fifteen weeks and the cubs are relatively small when born. A long period of gestation with a large foetus would make it very difficult for the mother to secure her food, and the danger of accidents and miscarriages would be great. The cubs are moved by the mother if she has been seriously disturbed. At night she will remove one after the other to an entirely different valley, carrying them in her mouth. When about two months old they leave the lair and gradually extend their wanderings, and by the time they are the size of a spaniel regularly accompany the mother. Tigresses have the maternal instinct less strongly developed than panthers, and although they will sometimes defend their young, fear usually overcomes affection and they will slink off. I have known two cases of a tigress following up and demonstrating at the men who were removing her dead cub, and one case in which a large cub followed up the mother. On this occasion, it was dark before we got out of the jungle, and the experience was most unpleasant.

The cubs often remain with the tigress until they are two years old; they are then between 7 and 8 ft. long. At this stage the tigress is usually about to initiate another family and the cubs are discarded. I have known cases however in which cubs born at two different periods have accompanied the tigress. In such circumstances the first family has consisted of one cub only, and the interval between breeding has been

short. Before the old cubs are discarded, family parties are not uncommonly met with, but do not last long, as no doubt the approach of the breeding season and the presence of papa is a strong hint to the youngsters to clear out. The largest party I have ever seen together consisted of six animals—one large male and two fully-grown females, accompanied by three young animals almost as big as the tigresses. I had a good view of them as they crossed an open nala after being hunted off the putrid carcass of a chital stag. Parties of five are not uncommon, and I once saw three full-grown males all together.

Tigers grow until they are five years old, and for many years after this they continue to put on muscle and fill out: as a man does after growth has ceased. The age to which tigers live is not known, but I believe it to be much greater than is generally supposed. I once killed a well-recognized tiger of marked characteristics which had been known to be in the same jungle for fifteen years. He must have been some age, at least five, before attention was drawn to him and thus not less than twenty years old when I shot him. He then appeared to be in his prime, with perfect teeth and without any signs of decadence.

One hardly ever comes on a tiger which has died a natural death, and I have only come across two diseased animals out of some two hundred animals I have seen shot. One of these had a complaint of the liver, and the other had small cysts in the lungs containing small white worm-like parasites. Both were very thin. The oft-repeated tale that a tiger's age can be told by the lobes of the liver is a myth; to give one instance, a tame tiger which was eighteen months old had eleven lobes.

•Tigers inhabit any jungle of sufficient size which affords food, water and shade. They are found as permanent residents in every district in the Central Provinces except two, and all the Central districts traversed by the main Satpura Range and its offshoots still contain many tigers. They are also numerous in Raipur, Chanda, Bastar and the Feudatory States and Zemindaris in the east of the Province. Nevertheless, tigers have vanished from the comparatively open nalas in which our ancestors found it so easy to kill them, and even in my time they have disappeared, or at most are only occasional visitors in many of the outlying jungles.

◀The usual daily round of a tiger is to commence questing for food shortly before sunset and to continue doing so all night. In thus questing, they go at a slow walk often following the beds of nalas and jungle roads, especially so in the cold weather when cover is dense and the grass is wet and cold. Their chief desideratum is any spot along which they can proceed silently and which affords a fair vision. In spite of frequent halts to listen for game they often cover great distances during the night. While questing through the jungle the tiger glides silently along. He seems to flow past one like a phantom. This impression is created by his silent tread, but more so by his action, which seems specially adapted for concealment. Both limbs on the same side move together or almost so, and it is this which produces the gliding effect. The only motion which draws attention is the flick of the ear when tickled by grass or a fly. The ears are full of wax which probably attracts flies; at any rate the tiger is very intolerant of any touch on the ear.

I have seen a tiger half asleep in a cave keeping

up a constant twitching of his ears to keep off the flies, and they are probably so accustomed to this motion they cannot avoid giving effect to it on the slightest touch. The highly developed series of hair combs specially adapted to exclude flies and which is so commonly found in antelopes are absent from the tiger's ear. They retire shortly after sunrise to some shady spot where they sleep. In doing this they will adopt any position, either lying on their sides or at full length on their stomachs with their heads between their paws, but a common position when gorged is to lie flat on their backs with all four feet sticking up into the air. Although easily approached when in this position and under the conditions which induced it, to place a bullet in the right position is difficult, and the hunter is advised to arouse the tiger before firing. Another common habit of tigers is to take a dust bath, which they do by rolling in sand or more commonly in the powdered earth of a cart track. They are always infested with ticks. These ticks greedily attack human beings and usually give most virulent bites, the irritation from which disappears but slowly. Ticks harbouring on ungulates are a different species and are tardy to fasten on human beings.

In cold frosty weather they often go up to the hill-tops and sun themselves before lying up for the day. I have often remarked that in Sal Forests tigers are much more liable to be encountered wandering about during the day than in Teak and Mixed Forests. In the hot weather tigers prefer to be near water, and if they can find a shady pool will often lie in the water up to their necks or refresh themselves by a bath from time to time. Although tigers usually drink twice during the twenty-four hours in the hot weather, I have known cases in which they have preferred not

months old had eleven 1888

to drink at all, and to remain near their kill rather than go a long distance to water.

Another habit of tigers, which they occasionally practise, is to sharpen or clean their claws on trees. This habit seems to be more an individual peculiarity constantly practised, rather than a general habit occasionally practised; as where the marks on trees are seen they are usually numerous and made by the same animal, whereas miles of jungle containing tigers may be devoid of all signs of the habit. I knew a particular Mohwa tree in a certain valley in the Melghat where a tiger regularly scraped his claws every three weeks or so. He evidently stood up on his hind legs and pulled his claws down, making deep incisions in the bark. This practice had been going on for years, but no other tigers for miles round indulged in it.

It is necessary to mention one more habit of tigers. Before passing their dung they scrape a bare patch on the ground. In doing this the tiger appears to be suddenly seized with a form of cramp, and they shovel their two hind feet back and fore touching each other and scraping the ground so as to leave a clear patch about 12 in. long and 6 in. wide. They then move their heels to the end of the bare place and relieve themselves on the patch. Although they will do this on bare ground it seems clear that the habit is a hygienic one. The fæces of tiger is a black tarry viscid substance, which if deposited in grass would often befoul the tiger's hind quarters. Tigers are very cleanly in their habits, and it is rare to shoot one that has not been perfectly groomed. Although indifferent to their state when killing and eating an animal, they set to and clean themselves thoroughly with their tongues immediately after feeding.

If in the course of the night's wanderings they succeed in killing, they proceed to eat, commencing between the buttocks. They often drag out the stomach as if aware that by so doing the meat would remain fresher. In most cases leopards tear out the inside and commence to eat the heart, liver, lungs and flesh on the ribs. The kill of the two animals can be distinguished by this, but I have known very large leopards such as are often found inside forests and away from villages, feed like a tiger. If a large animal has been killed, he eats up to the ribs the first night and finishes the remains the next night. As the sun rises, the tiger's first care is to secrete his kill, especially from vultures. He does this by dragging it under a bush. If the jungle is a long way off, they will often tear up grass with their teeth and so cover the kill. I have watched them in the act and once shot one with a sheaf in his mouth. I have also known a tiger lie down and go to sleep actually on the top of a dead bullock so as to protect it.

The majority of animals after eating go to water, and if the kill is near a suitable place, they return to its vicinity and then lie up for the day, commencing to feed again about dusk. It is astonishing what a hungry tiger can eat, and I have known three-quarters of a fair-sized buffalo to be swallowed at one meal. When thoroughly gorged, tigers take no serious steps to procure another meal for two days. It is probable that on the average they do not kill more than once in four or five days. When returning to their kill they do so cautiously. Their method of eating is to lick off wads of meat with their tongues, which are bristly, and when a fair-sized piece has been semi-detached, it is severed with the incisors. Skin,

bones and all are eaten ; hair seems to take the place of vegetables and they do not thrive without it. Their food is entirely animal, but I have been shown cow dung part of which had been eaten and which I was assured was the work of a sick tiger. I cannot vouch for this, however.

Besides killing for themselves, tigers will eat any fresh carcass they may happen across, and I have even known them eat animals which were absolutely putrid. I have already mentioned six tigers on a putrid chital stag. This animal was one I had wounded and lost, and it had been lying dead in long grass for a week. I discovered it by the smell. The men sent to fetch the head returned in great excitement, reporting several tigers on the carcass, and when I arrived I found that the body was a mere shell and that these tigers had been scooping out the inside which consisted of smell, maggots, and putrid flesh.

On another occasion I was out stalking in May in the Chanda district. There had been a heavy shower of rain and the fallen leaves being soaked it was possible to move silently. The bamboos had seeded some years previously, and the jungle was a mass of fallen bamboo clumps, making progress difficult and tortuous. I was behind a fallen clump when I became aware of the smell of some dead animal, and also heard crunching. Looking between the dead stems I made out a tiger's head on the other side of the clump about 10 ft. away. Firing between the stems I killed him stone dead with a shot in the forehead. He died with his mouth full of maggots which he was scooping out of a young sambar.

Owing to the position the tiger holds in the jungle, he is brought into contact with every animal it contains. This is not the case with any other animal.

The tiger occasionally kills wild buffalo, bison, bear and leopards. Their chief food consists of cattle, sambar, pig, nilgai, barasingha, chital and porcupines. They also occasionally kill goats, barking deer, and four-horned antelope. Their relations with wild-dogs have been described under the chapter on Wild-dogs.

They are sometimes in touch with a jackal who acts as a sort of "chela." There is a common story that a jackal utters a peculiar cry called "pheal" when in the company of a tiger. The only one I ever heard calling in the company of a tiger did make this peculiar noise, but I have often heard them do so when there was no tiger within miles. The call is probably one of alarm or suspicion irrespective of the cause. I once saw three full-grown male tigers walk out abreast in a beat, only a few feet separating them, and a jackal was scampering in and out between the tigers quite obviously "sure of his ground." The jackal is a cheeky, intelligent, adaptable and insignificant animal, in no danger from the tiger, but to whom it is quite conceivable that he might be useful. The jackal referred to above and which uttered this peculiar cry did so on becoming aware of my presence of which the tiger was ignorant. The jackal is very much alive to his own interests, and one attached to or adopted by a tiger would have a very easy time, and he is the only animal which has anything in the nature of friendly relations with the tiger. All other animals fear and hate and shun him. His progress through the jungle either by night or the daytime is advertised by the screams of all of peafowl, monkeys and all the deer.

It is not every tiger that will attack a large wild boar, and natives sometimes give one most circumspect

stantial accounts of the tiger being worsted. This is conceivable, the pig's neck is almost unbreakable and as a large jungle boar may weigh as much as 300 lb. the fight is not so unequal as it might appear. Porcupines, judging by the frequency with which one finds quills sticking in tigers' paws, are probably killed by a blow of the paw. An instance of a tiger having been killed by a porcupine's quills has been recorded.

Tigers, when disturbed on their kills, will usually abandon the same without protest; but if the kill happens to be a pig or a porcupine, they will often defend it, and it is not safe to drive a tiger off one of these animals. Whether this conduct is due to their being inordinately fond of this fare, or whether the difficulty they sometimes experience in killing these creatures enhances their value, I cannot say; but this attitude of the tiger, which I have personally experienced, cannot be due to mere coincidence. Moreover, the tame tiger which I kept was always most reluctant to abandon a piece of pig meat. He, of course, had had no experience of killing pigs, and this would make one inclined to think that tigers were particularly fond of the flesh.

With regard to a tiger's character and intelligence such observations as I have been able to make are based on a wide experience with the wild animal, but I am largely indebted to a tame tiger I once reared. This tiger was caught in the Mandla district when about two months old, and was brought up loose with a pack of dogs I then had. This tiger while I had it, was not tied up except at night and roamed about at will. It used to come for walks with me in the jungle. It was fed very much as a wild tiger is, getting a gorge when meat was plenty, and again sometimes going

two or three days without food. I had it under conditions which approached those of nature as nearly as possible, until it was quite a fair size, as big as a St. Bernard dog. Now, the impression I got from this animal, and from the wild tiger as well, is that they are animals of extraordinarily little intelligence. They possess very fixed habits and instincts, and these serve them to get through life and deal with the exigencies thereof. No doubt cubs get a certain amount of instruction, notably in the art of killing, from their mother, but the great mass of their habits and character are inherited and they acquire little beyond this.

The cub, although brought up with dogs, learned no dog habits and he was always a tiger, pure and simple, and acquired nothing except what developed out of his own nature. He would proceed down a nala, take cover and stalk in exactly the same way as a wild tiger, all of which actions, under the circumstances, were meaningless. The first time he killed one of my sheep he did so as to the manner born. Viewing the history of the tiger, all the intelligence he requires is to be able to stalk and kill game. This requires little or no reasoning. His instincts serve the purpose. He is accustomed to conceal himself in stalking game and knows how to apply this art when hunted, but he has no education in "self-preservation" and has missed all that this means. Circumstances under which he is often hunted and shot preclude his being an animal of much intelligence.

In dealing with his senses, his most important are his powers of hearing. It is on his ears that he chiefly depends; especially in thick cover, for detecting the presence of game. Their powers of hearing are quite re-

~~monous and extend much beyond anything usually imagined.~~

When out for a walk in the jungle, my tame tiger would often wander into the grass at the side of the path. He had been trained to associate food with a very low whistle, and he could hear this at an incredible distance and return when summoned in this way.

The eyesight of the tiger is also remarkably good, and it is on this sense and hearing that he depends. They nearly always detect the slightest movement, but unless they look directly at one may fail to pick one out from the surroundings provided one remains motionless. Their powers of vision are therefore very much less than the peacock's. They possess great self-control however, and on suddenly catching sight of one need not disclose that they have done so, which deer and most animals invariably do. I have known tigers come slowly out in a beat, and suddenly becoming aware of the sportsman, continue to come slowly on until they reached dead ground and then break back. No deer has this self-possession, and they would always make it evident that the sportsman had been seen.

With regard to the sense of smell, they hardly possess any, and what little they do possess they seldom use. Animals develop this sense either to hunt game, get their food, or for self-protection. None of these causations apply to the tiger. They find their game by their ears and eyes, and having stalked it they rush upon it. They do not run things down like wild dogs. They have been "top dog" in the country they inhabit for so long, their strength and ferocity have been all the protection they required. If they possessed even reasonable powers of scent it would often be impossible to drive them up to guns under the circumstances commonly in vogue. The tame

tiger I had, if his food was removed and hung up on a branch, was unable to locate it. Moreover, if removed and dragged along the grass, he never even attempted to scent up the trail, but hunted round in circles until he came on it. I have seen a wild tiger do the same in cases when his kill had been moved. Any animal accustomed to use its nose or place any reliance in the same would have followed by the scent.

A common experiment with my tame tiger when eating the leg of some animal in long grass close to camp, was to throw a blanket over his head and remove him, at the same time removing his food. He would then be released in long grass 50 yards off. He had a marvellous sense of locality and would return exactly to the spot where his food had been, but never attempted to find it by scent. He circled round until he came on it in its new position. It was curious to note also how his anger or ferocity seemed to be aroused by eating, or possibly the instinct of defending what was his. The Arabs have a proverb, "The lion gets angry even with his dinner." This might be said equally well of the tiger. Another curious habit was his addiction to lapping hot water, and he always visited the bathroom at tub time. Other wild animals will do this.

Tigers are still often referred to as having a good sense of smell. He is a very wonderful animal in many ways, and it is probable that on this account he is unthinkingly endowed with powers he does not possess.

From time to time there has been much correspondence on how the tiger kills his prey. One reason for this is that one is apt to forget that a tiger kills a number of different kinds of animals under varying

monious and that he varies his methods accord-

ingly. Few observers have been lucky enough to have seen an animal killed more than once or twice, and the circumstances may not have been the same as those witnessed by somebody else. The tiger is a most efficient engine of destruction, and although he has his favourite methods even he has to vary these. I have seen tigers kill deer under natural conditions twice, and bullocks in a herd three times. I have come on numbers of wounded animals, including bison, and of course I have examined innumerable carcasses of most animals. In addition, I have frequently seen tigers kill a bait right under my feet both in broad daylight and in bright moonlight.

With regard to the deer and the loose bullocks, which were of course capable of moving, the tiger sprang up and in three short bounds had seized the neck. The animals had started into motion, but the shock of the tiger's rush immediately rolled them over, and the tiger, hanging on to the neck, twisted the same in the opposite direction to which the body of the animal was revolving. The weight of the revolving body opposed by the twist on the neck in the opposite direction resulted in instant dislocation. This method of breaking the animal's neck will be referred to again when tied-up baits are under discussion. Sometimes a tiger will rush into a herd of cattle and down three or four beasts, far more than he has any use for. This is generally the work of a young tiger proud of his skill and rejoicing in the ease with which he kills.

I have several times shot animals recently mauled by tigers, which had evidently got "under way" in time, and had thus avoided being seized by the neck. I recall a typical case of a nilgai bull in which the tiger had fastened his left paw into the nilgai's ribs and had

seized the buttock in his mouth. The strength of the bull had enabled him to break loose, and he got away with a deep score along his ribs and flank, and about 2 lb. of meat and skin flapping on his hind quarters. The sambar's habit of holding his head up, and antlers back, when galloping or startled, often foils the tiger.

We have so far been dealing with animals which the tiger can master and whose neck he can break. He cannot do this to fully-grown bison or wild buffalo, and therefore other means must be adopted. Large heavy animals are helpless if they have lost the use of one leg, and in all cases that I have known, in which it seemed clear that the tiger could not attack the neck with much chance of success, they have first of all hamstrung the beast. I have never seen this actually being done, but such animals have been found hamstrung, and appear to have been bitten on the hock joint. Col. Fenton states that when tigers kill camels they invariably attack the legs.

Various observers, from time to time, have recorded that in Burmah, tiger constantly hamstringing animals, even comparatively small beasts like sambar hinds, and one instance has been recorded from the Central Provinces by Caton Jones of a tiger attacking this animal's hind leg. Except under the above circumstances, tigers in the Central Provinces hardly ever attack the hock. I am not aware of the conditions prevailing in Burmah, but I have always been led to understand that the cover there is generally much denser than in the Central Provinces. If so, this would often make it difficult for a tiger to rush in and make a frontal attack. To be sure of success he must see the neck clearly and keep it in view. It is possible, therefore, that in dense cover the tiger finds it easier

to creep up to the animal from behind and seize it by the hind leg, and I venture to suggest that this is the reason for the difference in the behaviour of tiger in the two countries.

I have only once known a case of an animal killed by a blow of the paw, and this was done by a large tiger in Mandla which probably despised buffaloes as food. Anyway he walked up to a bait, broke in its skull and then passed on.

With regard to buffaloes which have been tied up as baits, I once saw a young tiger completely disconcerted because the buffalo did not attempt to bolt, and the tiger pulled up and retreated. It would almost seem as if he did not know how to deal with a stationary animal. However, they soon learn. This young tiger returned and commenced leaping back and fore over the buffalo's back. No sooner did it alight on one side than it was back again to the other. I never learned whether it was trying to get the buffalo to run, or merely playing with a helpless animal, as it suddenly saw me. I was in a bush on the other side of the road and of course had to shoot it.

The above circumstances are exceptional. There are two ways in which I have seen buffaloes killed, and these have been repeated so often that it is fair to say that they are the usual or normal ways. Before proceeding to describe these ways, it is necessary to point out that two very common mistakes are made by sportsmen. The first is that they are far too ready to assume that the neck has been broken: this often cannot be ascertained unless a detailed examination is made, and the neck is not broken at all in a great many more cases than is generally supposed. The next most common mistake in the diagnosis of the night's happenings is to presume that the buffalo has

been seized by the throat. In a great number of cases this is not so, and the animal has been seized on the top of the neck. The position of the teeth marks will show: when these are on the throat the animal has been seized from above, and when on the neck it has been seized from below. Failure to appreciate these facts has led to some confusion, and apparently accounts for the contradictions of Baldwin, Forsyth and Sanderson.

If the bait is fairly large and a tigress or small tiger turns up, the throat attack is preferred. It may be of interest to mention that if tigers come on the bait unexpectedly, they often give a "whoof" and make a temporary bolt, but soon return. The tiger advances stalking within 20 yards or so of the bait, head on—stands poised for a few seconds with one foot up, tail out straight, and swaying slightly backwards and forwards to get its balance. Two or three long rapid strides are then taken, and dipping its head like lightning under the buffalo's chin, the throat is seized and immediately pulled down on to the ground. The tiger remains thus pinning the beast's head and neck on to the ground. When in this position, the tiger is down on its elbows but the hind quarters remain up. The buffalo struggles to remain standing but presently falls over and in so doing sometimes breaks its own neck, which of course is pinned firmly to the ground all the time. On the other hand, this very frequently does not happen, and the two animals simply remain as they are until the buffalo is dead from strangulation and suffocation.

Assuming that a large tiger had turned up, a tiger who felt confident of being able to deal with the bait in a masterful manner, he comes in at the gallop, pulls up, rears on his hind legs, seizes the buffalo in his

jaws right across the back of the neck and passes one fore paw to the far side of the neck. He then swings his hind quarters and hind legs into the position assumed by animals in breeding and while violently thrusting the buffalo's hind quarters forward with his belly, he at the same time, with equal violence, pulls back its head and neck, which cannot withstand the strain, and breaks. The tiger then dismounts on the opposite side on which the attack was made, still retaining the neck in his jaws. By doing this he gives an additional twist to the neck. I have seen a tiger hang on and continue this twist until the buffalo's head was reversed and looked along its back. This, however, always appeared to be unnecessary, as the terrific purchase the tiger had obtained by being able to press the buffalo's body forward at the same time as the neck was wrenched back, effectually broke it. I once shot one in this position, but the buffalo dropped dead. On another occasion I shot a tiger stone dead which had completed the movement, and although still holding on to the neck, had twisted it so completely as to be facing the buffalo, having turned through 270 degrees. After death, the jaws remained in situ held by the canine teeth embedded in the neck. Unfortunately, it was too late to photograph. Sometimes the above procedure is varied by the tiger giving the buffalo a preliminary shaking, apparently with the object of satisfying himself and settling in his teeth.

Anyone witnessing these attacks is bound to be awed by their ruthlessness, and the savage ferocity of the tiger, and cannot help being struck with the lustful pleasure the tiger evidently takes in killing his prey.

I have never seen a tiger suck the blood from the

neck, nor have I ever seen any signs of this having been done. It has always been a matter of some astonishment to me how the story that they indulge in this practice is so commonly repeated even in recent publications such as Best's, who, while admitting that he has never seen a tiger kill its prey, refers to their lapping the blood. It is presumed that sportsmen notice the absence of blood in any quantity on the ground, and without considering the matter, wrongly attribute this to the tiger having disposed of it. So far as I am aware, out of all the authors mentioned in the Preface the only ones who show any doubts on the subject were E. B. Baker, Dr. Blanford and Sanderson. A large vein is tough and elastic, not easily severed by a blunt instrument like a tiger's tooth, and the jugular is seldom cut. But even if it is, no great amount of external bleeding can take place. The facts are that the tiger retains his hold on the neck long after the animal's heart has ceased to beat and the holes in the neck are thus effectually stopped so long as circulation continues. Such active bleeding as takes place is, therefore, internal; moreover, this must be largely reduced by the vice-like pressure of the tiger's jaws on the part seized.

When the tiger releases his prey only a little of the local blood trickles out by gravity from two of the wounds. If the absence of blood is to be accounted for by the tiger sucking the blood, it is incumbent on him to suck four different holes at the same time. The real facts of the case are as I have stated, and there is little or no blood to dispose of, nor does the tiger suck the wounds.

✓ One other method of hunting, rather than killing, must be touched upon. Two tigers hunting in company will separate, and one will stalk and then try to rush

the deer on to the other tiger which lies concealed. How far this plan succeeds and is adopted in thick cover, I cannot say, but probably seldom. I have only known it adopted in the case of a herd of barasingha which persistently refused to leave bare open ground, where no tiger could approach unseen. This ground was a small area surrounded by long concealing grass. The barasingha seemed to be thoroughly aware of the position of the concealed tiger and avoided going near it. They continued to feed, pending the next onslaught. The tiger that did the driving rushed out of the long grass at full gallop, roaring, and then retired to whence he came. The same manœuvre was repeated three times from different sides. On one occasion the tigress also charged. My participation in proceedings only resulted in one of the tigers being wounded, which subsequently escaped.

Sometimes the presence of a tiger seems to have a mesmerizing effect on deer and appears to benumb their faculties.

On one occasion I was out in a Sal forest at daylight. The cries of deer and monkeys advertised the presence of a tiger or a leopard in a neighbouring maidan, so we pushed the elephant along and came on a very large tiger crossing the bare open ground of a deserted field. Two barasingha stags were standing at the edge of the field and within 12 ft. of a wall of grass 10 ft. high. They were close together facing the tiger, but braced back, and stood motionless, braying. The tiger's line would have taken him past the stags, but he gradually swung in and approached the stags which allowed him to come within 20 yards. The tiger then straightened his tail, lifted one huge fore paw, and started the usual preliminary swinging

which indicates his intention to charge. The stags seemed rooted to the spot and had by this time ceased to bray. They were certainly in the greatest danger. This seemed to be entirely due to their inability to move, as long before danger arose, they could have disappeared at one bound in the long grass. I was halted at the edge of the forest about 80 yards off. Unfortunately, the play ended before the last act. I was accompanied by a friend who was anxious to shoot the tiger. He was using a heavy rifle and black powder. Everything vanished behind a cloud of smoke and when this cleared the maidan was empty.

Man is so feeble an animal, tigers do not require special methods of attack in order to break his neck, and can kill him easily by biting him either through the body or the neck. I once saw a case in which a man-eating tiger had driven in a man's skull with a blow from his paw delivered on the top of the head. Evidence of how man-eaters behave in killing, or towards a live victim which they can carry off as easily as a dog does a rabbit, is of course scanty. Apropos of their strength I once saw a tigress drag a half-grown buffalo up the bank of the River Tapti without apparent effort. The bank was alluvial soil and so steep, a man could only have climbed it with difficulty without the use of his hands. >

I was once stalked and charged by a man-eater which got within a few feet of me before I shot it. I cannot say, therefore, if it would have taken me at the gallop, or pulled up and then bitten, but this is probably what it would have done. Man-eaters usually reject the skull and the palms of the hands and the soles of the feet. The story of Jezebel was evidently recorded by an accurate eye-witness,

as animals which eat men seem to dislike these parts.

When a wounded tiger charges, if the man is running away or moving, they will take him at the gallop, but if one stands still they invariably pull up dead and then attack. But for this habit, some sportsmen, including myself, would not be here to-day. In attacks by wounded tiger they usually knock the man down and give him two or three rapid bites, often through the thigh, and then leave him. I have known an unwounded tiger in a beat, however, round on the men, and after mauling one, pick up another and carry him off. In this case, although the tigers had been headed back, the attack was chiefly due to the tiger being with a female at mating time, and after the tragedy he came out on a fireline dancing on his toes, with his tail waving in the air and evidently very proud of his prowess, for which he no doubt expected to be rewarded.

Tigers, when making a galloping charge at man, give vent to a deep short grunting cough repeated two or three times. The volume of sound is so great, it is sometimes difficult to locate its direction accurately. On occasions they will steal in and attack silently, and they nearly always attack animals in silence. A tiger suddenly disturbed and retreating often gives a "whoof," and when trying to break a line of beaters they will gallop along the line roaring. This noise is quite different, however, from the cough they make when intending to attack. Tigers growl as a warning when angry. A deep long drawn out "meow" is another call, and when pleased they make a purring noise by blowing air on to their lips which vibrate, not unlike the action and noise made by horses when they wish to clear their mouths

and nostrils. They show emotion by a twitching in the end of the tail. This may be either pleasure or annoyance.

Cubs make complaining squeaks, but on the whole the tiger is a silent animal, and considering their numbers they are seldom heard to give a regular roar. When they do this the sound is awe-inspiring, and the whole valley will sometimes ring with the volume of sound produced. The noise is produced by taking a deep inhalation and then expelling the air violently against the roof of the mouth, the lower jaw being slowly closed at the same time. The result is a long drawn out "H—o—w—n." They sometimes repeat the sound three or four times in succession, and commence moderately, but "work up" and with each repetition increase the sound. When tigers do this they are generally trying to get in touch with a mate.

On one occasion, when camped in the middle of a forest, I heard the roaring of a tiger taken up and answered by another. The two animals gradually approached each other and a terrific fight ensued not far from the camp, the scene of which I was able to visit next day. About six weeks after this, in all probability I shot one of these tigers, judging by the marks on his neck and body. He was an immense beast. Nevertheless, he appeared to have had the worst of it. However, we never saw "the other fellow," and this deduction may have been that of "the casual observer." For some unknown reason tigers are more given to roaring in some districts than in others, and I have always found them more noisy in Sal forests than elsewhere.

One more noise, which is rarely heard outside Sal forests, has to be described. This is the curious

"pook" they make not unlike the sound produced by a sambar, and about which there has been considerable discussion. This noise can be mistaken for that of a sambar, but it is really softer and not so loud or harsh. No sambar could mistake it for the call of another sambar, and the suggestion that tiger call up sambar in this way can be turned down. Moreover, the noise made resembles the sambar's cry of alarm, and how this could be an inducement for the sambar to approach the spot whence the alarm issues, is not understood. It might be argued that by making the noise the tiger induces a sambar to "bell," and thus locates him, but the tiger has other means of doing this. The call is really a mate call and is used by tigers to locate each other. I have nearly always heard it made when there were two tigers going about together. I have had a tiger make it at me, thinking I was his mate or at any rate wishing to find this out.

Two tigers had killed a fairly large buffalo in long grass. The tigress had left the kill, but when I came to it the tiger was on the buffalo. Hearing me coming he picked up the buffalo and took it off with him through the grass which was very high and dense. I followed up, when he dropped the kill, and commenced this noise at me. He repeated it a number of times from different points and retreated making the noise. Of course, I could not give him the reply he wanted, but this came presently from the hill-side, and he went off and joined his mate. These tigers both returned after dark and spotting me in a tree roared lustily for some hours. Seeing it was useless to wait longer, I got down and returned to camp. They then came up to the kill and ate everything except the skull and hoofs.

~~eating tigress will also bring up her cubs to kill man~~

Tigers seldom attempt to climb trees, but that they can do this to a much greater extent than is generally supposed, I firmly believe. They can certainly get up a branched tree at which they can rush. The number of fatal accidents is evidence of this. I do not think a large heavy tiger could climb a smooth limbless tree, but tigresses and smaller tigers can get up a tree with only a small amount of assistance from side branches. Credible witnesses have told me on different occasions that they have seen tigers treed by wild-dogs, and I have been shown the hair of a tiger on a branch 15 ft. from the ground.

Tigers take to water readily and are strong swimmers. I have known them swim the Nerbudda to escape out of a beat, and on one occasion a wounded tiger that was being hunted did this. They must have swum to get on to the Island of Singapore, and some years ago it was reported that a tiger had actually crossed over on to Hong Kong. They are great wanderers, and at times seem to lose themselves and get into the most extraordinary places. There is a circumstantial account of one being found in a pagoda in Burmah. Three tigers were once found in the Buldana District trekking across open country, and miles from any real holding ground.

Again, while I was Divisional Officer of the Melghat, a young tiger left the jungles and took up its abode in some Pan gardens near Ellichpur. It was hunted and actually shot in a Pan garden after an exciting chase in which it displayed the activity of tigers. I was informed that, during the hunt, the tiger leaped the sides of the garden, which were 6 ft. high, like a greyhound. I myself have seen a tigress clear a 19 ft. gully in one stride without effort or gathering herself

~~and in alighting she gave the impression that~~

she would not have crushed an egg, so easily was her weight carried. Straying into unusual places is the more surprising as the chief characteristic of the tiger is his retiring habits. Their chief endeavour in life seems to be to avoid being seen or having attention drawn to them. On the other hand, there are instances of extraordinarily bold behaviour at night, and they have been known to return to their kills again and again after being fired at. These cases however are exceptions.

For so large an animal, tigers must be considered rapid breeders. At one time in parts of India at the beginning of the last century, they were so numerous it seemed to be a question as to whether man or tiger would survive.

Up till about the beginning of the present century, sportsmen only visited the Central Provinces in moderate numbers, but about this time shooting became a popular pastime amongst army officers, and tigers were much reduced. The war practically put an end to shooting, except by district officers, and during its duration, the tigers rapidly increased. Few tigers are killed by native shikaris. These chiefly shoot deer. It is the European sportsman that thins out the tiger.

Any cause which prevents a tiger getting his natural food, tends to create man-eaters, as tigers fall back on the easiest animal of all to kill and his instinctive dread of man is overcome by hunger. Moreover, this instinctive fear soon goes once he realizes how helpless man is. Tigers may be unable to procure their ordinary food by reason of worn-down teeth, lameness, or some wound. Again, there may not be a sufficiency of natural food to meet their requirements. A man-eating tigress will also bring up her cubs to kill man.

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Since the war, there has been a very large increase in the number of man-eaters. Hardly a gazette is issued without announcing special rewards for about twenty different animals. The bulk of these animals is in the east of the Province. It is possible that the rapid increase in the number of tigers during the war, with no increase in the food supply, but rather the reverse, has led to the present conditions.

The presence of a confirmed man-eater in a jungle tract is a dreadful scourge. Some people have to pass through jungle almost daily, and no man on leaving his village can be sure of returning. The man-eaters often develop boldness and a fiendish cunning, and their presence is a blight on the whole community. A book could be filled with jungle tragedies.

The knowledge man-eaters acquire of men's habits, as well as their habit of eating up most of the corpse at a meal and not returning, adds to the difficulty in killing them. Moreover, there is a widespread belief that the ghost of the last victim sits on the tiger's head, and that he who gives information regarding the tiger's habits is selected by the ghost for the next victim. There is often much difficulty, therefore, in obtaining the necessary assistance to encompass a man-eater's destruction. If the perusal of this chapter induces even one sportsman to hunt down one of these man-eaters, it will not have been written in vain.

(Animals which have become confirmed man-eaters usually decline to kill a buffalo or bullock, but will often kill a pig or a pony, if these are tied up as baits. I have known other tigers, not man-eaters, to have a similar preference, but the disinclination of man-eaters to eat beef indicates that their palate has undergone some definite change.)

The great mass of tigers are partly cattle killers and partly game eaters, but some animals living in forests such as are found in Mandla and Balaghat, where game is very abundant, hardly ever kill cattle. On the other hand, many parts of the Province now contain little or no game, and in such places the tiger lives on nothing but cattle, and follows the herds about as these are shifted for water and grazing. In tracts of this nature tigers are particularly liable to develop into man-eaters.

In the Zemindaris of Bilaspur, I found the tigers had definitely changed their habits and did all their hunting by day. It was some time before I found this out, and I was surprised at the difficulty in getting a bait killed, which of course was tied out all night. The facts were that there was absolutely nothing for a tiger to hunt at night, as there was no game, and all the cattle were driven into pens at dusk. Each tiger made a round of about six villages, taking a bullock from each in turn. On the other hand, I have known tigers living in forest containing little game and yet seldom killing cattle, and it has often been a matter of no little speculation when shooting an animal in the pink of condition in jungles of this nature, where the tiger obtained his food.

Although tigers do a great deal of damage, they have their uses in preserving the balance of nature. There is an outlying patch of forest in the Hoshangabad district which always contained a few tigers when I was there in 1906. Some years after this, they were all shot out, and the forest being isolated no others wandered in. I visited this tract again in 1917, and the surrounding villages were simply overrun with pig and nilgai. Many fields had gone out of cultivation.

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To enlarge a couple of tiger in this forest would be a great boon to the local people. This is not the only instance of the kind, and the extermination of tiger in such places should not be permitted.

CHAPTER IV

TIGER-HUNTING AND PRECAUTIONS WHEN HUNTING

The reader will have gleaned something of the ways and habits of tigers from the preceding chapter, and it is now necessary to describe the various methods of killing them and their behaviour when hunted.

The more knowledge the sportsman possesses of the habits of the animal in general, and of the particular habits of the individual he hunts, the greater his chances of success. Like every other animal, tigers vary in their ways. It will be understood, therefore, that the following remarks refer to the generality of tigers.

The first consideration is to decide how it is proposed to kill the animal, as this can be accomplished in a variety of ways. Stalking on foot is considerably limited in the cold weather when the grass is long and heavy and the tiger difficult to locate. Unless, therefore, the jungle contains some sure holding ground, such as a cave, which can be stalked, attempts to kill tiger by stalking in the cold weather should be limited to visiting the baits in the early morning, when the tiger will often be found on his kill. The position of the bait should be thoroughly studied beforehand, the line of approach decided upon, and the utmost care taken to approach silently. The same rule applies to a cave, and I have not only had tigers get away

unfired at, but been placed myself in an awkward and dangerous position through failure to make a preliminary survey of the terrain. Unless the line of approach is directly in the obvious line of retreat of the tiger, the shot can be taken with safety. I have seldom known them attack on being fired at for the first time.

On one occasion, I opened fire at three tigers feeding on a kill; they were on the opposite side of a nala. The sole survivor came straight at me, but on discovering my presence when only a few paces off, made a violent swerve to one side, clearly showing that he had no aggressive intentions. If the tiger is on the kill but escapes unfired at, the sportsman should rapidly conceal himself or climb a tree, and send his men away, talking as they go. In many cases the tiger will return in a few minutes to remove his kill or to find out if it has been tampered with. If the tiger is not on the kill, it is always worth while waiting ten minutes, as he may have been disturbed and will return, or he may be eating a detached piece of meat close by. To shoot tiger in this way it is necessary to tie the kill so firmly as to prevent the tiger dragging it away. To do this militates against the chances of success, if in the event of failing to find the tiger on the kill, a beat is subsequently arranged. On the other hand, if the kill has been dragged, to follow up the same seldom gives one a shot and is very liable to disturb the tiger. In good beating country, therefore, it is better not to tie the baits too firmly, but to visit these at dawn, and if killed and dragged to come away quietly.

Tiger-shooting on foot *par excellence* commences in the hot weather when water is scarce and the cover reduced. Isolated jungle pools in small nalas afford

the means of locating the tiger. It is best to tie up the buffalo firmly, as, if dragged, there is always some doubt as to whether the tiger will lie up near the kill or the water. The bait should be at some convenient spot a few hundred yards from the pool. The pool should have been previously inspected, and if the tiger is not likely to lie in the water, it is generally fairly apparent which spot he is likely to select for a mid-day lair. The place should be stalked in the heat of the day between one and two o'clock and the tiger will often be seen lying fast asleep. It is seldom that a satisfactory shot can be taken at an animal lying down, and the sportsman is advised to arouse him gently by making a slight noise when he will slowly stand up. I have several times come on the tiger lying in the pool immersed up to his head, but the pool must be shady, otherwise they merely take a plunge and return to their lair.

Another method of killing tiger on foot is to put a pack of dogs into the jungle where he is likely to be lying up. Sportsmen seldom possess sufficient dogs of the right calibre for this. I killed three tigers in this way before I lost my pack through rabies. The dogs bayed the tiger, who after a short burst soon pulled up, and standing with his back to a clump of bamboos, lashed out at the dogs with his fore paws or made short rushes, returning to the clump after each. The dogs baying and the tiger roaring as he charged, were sounds to set the pulse bounding, and so engrossed was the tiger he was stalked and shot with ease. The first dogs I tried on tiger were pure-bred bulldogs and bull terriers. These dogs were too highly couraged and went in and got killed.

On one occasion I was following a wounded tiger, accompanied by only one bulldog. This fearless

animal rushed in alone and seized the tiger by the side of the head, to be promptly scraped off like a fly and getting three deep claw marks from which he subsequently recovered. Fox terriers do not possess sufficient courage to bring the tiger to bay; they only follow yapping at a distance and require to be supported by the sportsman. The best dogs are half-bred bull terriers and fox terriers. Such dogs possess sufficient courage and yet are not too bold.

In gameless country where tigers are confirmed cattle-killers, the fresh pugs of a tiger round a particular village or even along a path going in its direction, are a sure indication that he proposes to kill a bullock from that village. The village herd should be driven out of the jungle at once pending the sportsman's arrival. It is generally fairly evident on which side of the village the tiger is most likely to be, but if not, on driving the cattle into the jungle, he rapidly makes his way to where they are. The sportsman keeps with the herdsman and the interest is intense whenever the herd approaches a nala, as it is nearly always in such places the attack takes place. A wild stampede of the cattle with tails in the air shows that another jungle tragedy has occurred, and if the sportsman has not actually seen the onslaught, he can always rapidly locate the tiger, and "nipping in" can shoot it while its usual vigilance is lost in the ecstasy of killing. If disturbed and not fired at, the hunter has only to hide for a few minutes when the tiger will return to remove his kill. There is much fascination in shooting tigers in this way, but it can only be practised with a reasonable amount of success in gameless country. Nevertheless, the same plan can be adopted in cases when a tiger has attacked a herd and failed to kill. The herd should be at once driven back

to the place. I once killed a tiger in Mandla in this way.

In the Central Provinces there is no such thing as shooting tigers off elephants in the generally accepted sense. This form of sport is practised in the Terai, where the conditions are absolutely different. Moreover, elephants are not procurable and few exist except those belonging to the Forest Department. In the middle of the last century sportsmen, with the aid of two or three elephants, used to quest along more or less open streams in the hot weather and killed many tigers in this way, but tigers no longer frequent such places. Inside the forest, it is impossible to bring the elephant up to the tiger without disturbing him, and it is only in some of the grass maidans found in Sal forests where an elephant can be used to hunt up a tiger. A detailed account of the use of elephants is therefore out of place in a work which treats only of game and sport in the Central Provinces.

The two commonest methods of killing tiger are either by sitting up over the kill or by beating, and the sportsman generally has to choose between one or other of these methods. The pros and cons as to which method is preferable in a particular locality are often numerous and vary considerably. Much also depends on the skill of the sportsman. Sitting up as compared with beating is essentially a beginner's method and where the location of the tiger is difficult and the country awkward, the novice will probably have more success if he selects to sit up. At the same time, if the choice between the two methods seems to offer fairly equal chances, I strongly advocate beating. The sportsman gains experience and if the tiger comes out he is far more likely to bag it. Night shooting is often most unsatisfactory and missing or merely wounding are

frequent occurrences. Other factors which limit the practice of sitting up are the phases of the moon or a particular tiger which is known never to return to its kill.

As a general rule, wherever good holding ground exists near the place where the bait has been tied up it is better to beat. By good holding ground I mean dense cover with shade and water which has not been habitually disturbed. It is not uncommon, however, to encounter country which gives no indication where the tiger is likely to be. Such country often consists of fairly open forest nowhere affording good holding ground for tiger, and where there is no particular spot which he is likely to select more than another. In fact, in such places he often rejects the local jungle altogether and goes several miles to a more suitable place. In tracts of this nature sitting up is to be advocated. It is always advisable to decide beforehand which of the two methods is to be employed, as the preliminary arrangements vary accordingly.

Assuming that it has been decided to sit up over the kill. The first proceeding is to select a site: in doing this the consideration is not to locate the tiger after he has killed as in the case of beating, but to secure a kill in a position where the tiger is likely to return to feed. It is a mistake therefore to place the kill where he cannot return to it through continuous cover from the main jungle. Exposed and open spots often disturbed by villagers, or between which and the main forest villagers habitually pass, should be avoided. Having satisfied these conditions, the more conspicuously the bait is tied up the greater the chances of a kill.

The top of the bank of a small nala on a fireline, which is also at the convergence of one or more jungle

pāths, is an ideal spot. The bait should be firmly tied by the fore foot with an unbreakable rope. It should be placed not more than thirty yards from the tree selected to sit up in, and this tree should not be situated so as to make it likely that the tiger will pass under or near it on coming to his kill. If there is a small hillock in the vicinity of the kill, the tree must not be overlooked from the top of the hillock. Tigers often inspect their kills from such places before coming out, and being more or less on a level with the machan discover it at once. I have lost several fine tigers by failing to observe this rule. In tying up the buffalo, a spot free of shade, especially during the early part of the night, should be selected.

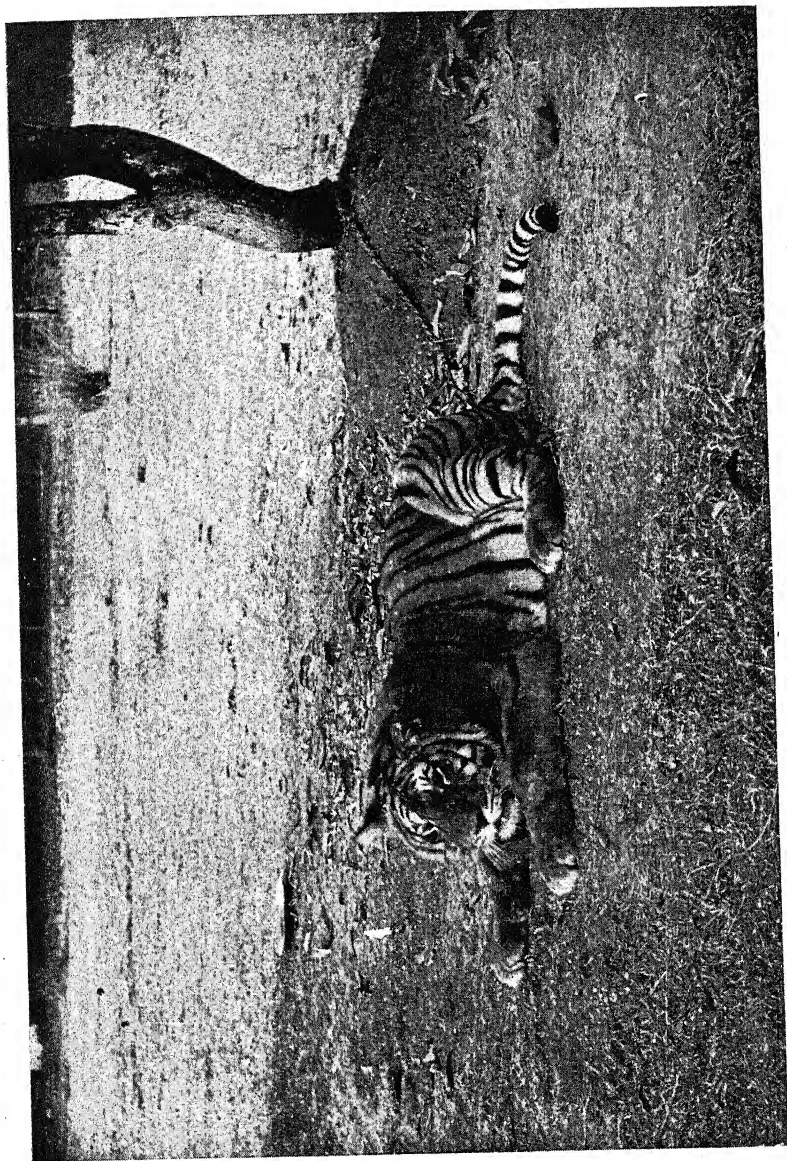
The novice is reminded that the moon and the sun follow a different path and throw different shadows. Visibility should be improved by removing branches if necessary and a good plan is to strew the ground round the kill with white chaff beforehand. The machan should be tied up firmly at a fair height: about 15 or 16 ft. from the ground is suitable. Too high a machan increases the difficulty of shooting, especially at night, when one requires all the assistance one can get. From a considerable height the tiger presents a comparatively poor target. On the other hand, to place the machan too low, while enabling one to rake the tiger broadside on, increases the chance of being seen. Ropes should not be left dangling to the ground from the machan nor should they be so placed as to cramp the swing of the gun: The machan should be thoroughly tested beforehand to see that it does not creak. It is most annoying, after one has taken one's seat and the men have retired, to find that the slightest movement produces a noise or shakes the tree. The reader may pardon me for entering into all these details, but he is

assured that in tiger shooting generally, the success of the undertaking is often dependent on preliminary trifles. It is more important to have light on the sights than on the target, and foliage obstructing the rays of the moon should be removed as much as possible, but leaving all cover round the machan, and if necessary this must be supplemented by freshly cut branches, on the sportsman taking his seat.

When a buffalo has been killed, it should be covered with branches so as to keep off vultures. If the tiger sees that vultures have been at his kill, he will often not return. A tiger which has itself covered the kill always intends to return.

It will sometimes happen that the shikari's and the tiger's idea of an unbreakable rope differ and the kill may have to be moved. It can be dragged back a short distance to its original place and again firmly secured. This is necessary, as I have known a tiger spring out and whip off the kill before a shot could be fired and then leisurely devour it in dense shade close by, a most tantalizing performance. Rather than move the kill any great distance, it is often better to remove it altogether and tie up a fresh buffalo and sit over that. The tiger will find it in searching for his own kill and the sportsman will probably be interested in watching the tiger's methods.

The sportsman should be in his place an hour before sunset and even earlier in the uplands of the Maikal Range, as I have consistently found tigers in these parts on the move sooner than in the Teak forests. After taking his seat, the ladder should be removed. If the sportsman is belated and the tiger is likely to be close at hand or even seen, it is necessary to drive it off sufficiently far so as to preclude the proceedings being overlooked: the men should retreat talking in



TAME TIGER, TAKEN WHEN ABOUT 12 MONTHS OLD.

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an ordinary way. The hunter should be supplied with a foot rest and bedding or cushions, in fact, anything that tends to his comfort, as the more comfortable he is the quieter he will sit. As one never knows what may happen, some food and drink and a lamp are often useful.

Patience and the faculty of being able to sit still, coupled with self-control, are the chief qualities required for shooting tiger by sitting up. The sport has often been decried, and while it is admitted that it does not call for the woodcraft and knowledge of the animal's ways needed in the case of beating, there is nevertheless a fascination in being alone in the jungle and one often sees other animals and curious sights.

As the sun begins to set, the whole jungle awakens and a lover of nature suffers no ennui. From time to time the stealthy approach of a jungle cat or a mongoose will create a false alarm. The hunter is strongly advised to adjust his night sights before the light has faded, as he can then test by aiming the approximate difference between them and the ordinary ones. Further, by this time he will probably be somewhat cramped, so he should move so as to get himself comfortable. This will ensure his being still during the most critical part of the evening. As the light gradually fades, the gun should occasionally be slowly raised and aligned on the kill. By this means the hunter knows beforehand what he has to find and align when the tiger comes out. It also tends to make him steady. It is most disconcerting to put up the rifle on the tiger for the first time and be unable to see anything clearly. There is often a silvery patch of moonlight a few inches off into which the end of the rifle can be placed, but it is necessary to know this beforehand.

The tiger often gives notice of his arrival and the excitement becomes intense, setting the heart thumping, and it is no wonder that a hurried and uncollected shot is often taken, resulting in failure. It is this the sportsman must chiefly guard against and he should raise his rifle with a slow deliberation, and align it on the tiger when the latter's head is turned away: he should then dwell long and carefully on his aim. The direction is usually easy: the elevation is the chief difficulty, and at this stage the sportsman will learn the value of his having tested his aim earlier in the evening. On other occasions the tiger does not announce his arrival and a ghostly silent figure is seen to float out, and but for his shadow, appearing at times as if he were almost transparent. On the other hand, the side of the tiger in shade appears black and the contrast in effect between the sides is astonishing.

The men should have been warned beforehand to station themselves with a lamp at some convenient spot within shouting distance, but they must be cautioned not to move until told to, as there may be two tigers, and if the first has been shot dead I have known the other to come back thinking that his mate was forestalling him in the feast. I once watched a large tiger sniffing at a dead tigress and he did not seem to realize what had happened.

So far, in discussing this method of shooting tigers, it has been assumed that the sportsman is prepared to deal with the difficulties nature has placed in his way and to give the tiger the benefit of these and a fair sporting chance. Modern inventions have eliminated these difficulties, and it is possible to sit up on the darkest night and when the tiger arrives to illuminate the whole scene by turning on an electric torch strapped to the

rifle or by a bulb hung over the kill. The tiger stands in stupid wonder gazing at what it no doubt considers some phenomenal star. The ethics of doing this have often been discussed and personally I do not think it gives the tiger a fair chance and does not call up those qualities in man which we expect him to possess when he hunts a beast like a tiger. One expects endurance, skill, self-possession and a certain amount of courage. The whole question turns on the extent to which artificial aids are legitimate and it may be argued that the rifle is the first aid. Without the rifle, however, it is impossible to kill the tiger and its use requires no justification. If we once admit the electric lamp at what point are we to stop? With modern inventions it would be quite easy to be playing cards in the tent and when the tiger turns up, kill him by pressing a button on the tent wall. This, while not departing from truth, is possibly stating an extreme case which would be condemned by everybody, but the point at issue is where in the scale is the personal element eliminated to such an extent as to be unsporting. Each person must decide for himself, but personally, except to get rid of a pest, I consider the use of electric torches oversteps the mark.

As an instance of what sometimes happens I may mention that on returning from a shooting trip in East Africa a Swede showed me an outfit which consisted of a high velocity rifle attached to a tripod which also carried a telescope and range finder. He told me that on one occasion he had set it up in a plain and killed seven species from one stance, gradually extending the range up to 700 yards. He seemed quite pleased with himself. Luckily conditions in India preclude this sort of thing.

Some sports, which have been indulged in for years

have become crystallized, and possess well-defined ethics, backed even by the law of the land, as witness, to take one case, the rules written and unwritten regulating salmon fishing and the killing of salmon. The poisoning of tigers, except man-eaters, is already forbidden, but the time has come when other methods of killing tiger should be reviewed and regulated.

Before quitting the subject of sitting up for tiger, it is necessary to mention one more means by which a tiger can often be killed.

Whether it was the original intention of the sportsman to sit up or not, whenever he comes on to a kill which the tiger has just left, he should immediately get on to a branch or hide in a bush and send his men away talking. The tiger generally returns in a short time. When the tiger has not been seen, one of the most useful indications of his having only just left is the fresh condition of the surface of the meat, but a surer sign is the position of the flies which have collected round the carcass. These will be found on the bushes and only a few on the meat, and as one inspects the kill they will be seen to descend on to the carcass. This is a sure indication that some animal has just left it.

In arranging to tie up for beating, the procedure is different. The object to be attained is to obtain a kill in such a place that the tiger can be located, and that it is reasonably certain that he will lie up in some particular jungle out of which he can be driven. Merely to obtain a kill is often useless and places must be selected adjacent to holding ground. The bait should be tied with a thin rope so that the tiger can drag away his kill. It should be tied in some conspicuous place likely to be seen from a nala or a jungle path. The

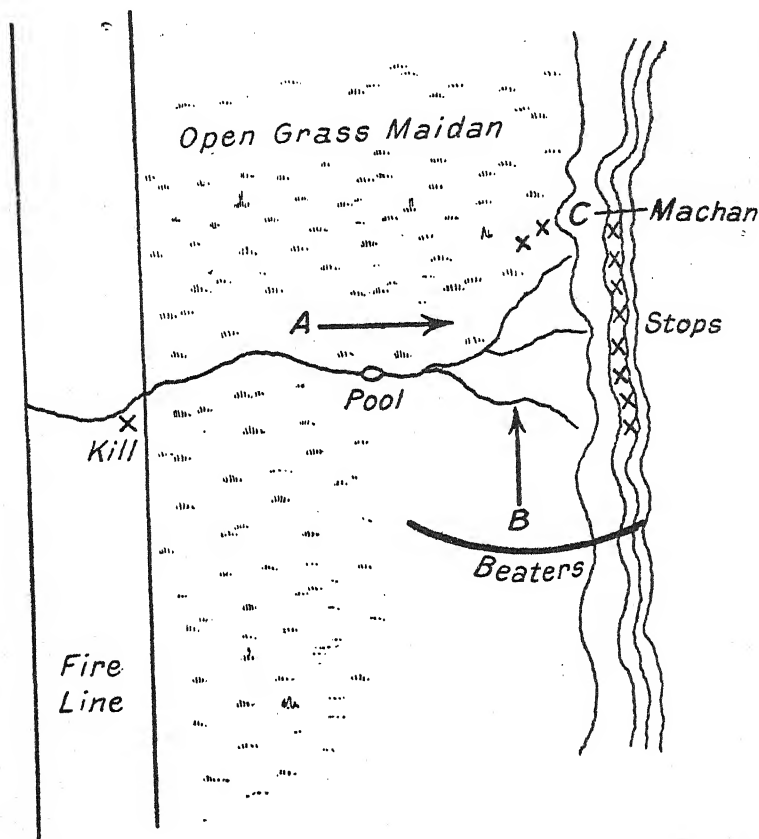
holding ground is often in the direction of a hill or on the hill-side itself. After eating tigers usually go to water in the direction of the hill. The jungle stream may contain several pools of water at intervals, and if possible the kill should be within 300 or 400 yards of the topmost pool. There are other considerations which preclude this advice being always followed, but it is often possible to avoid the uncertainty of not knowing to which water the tiger has gone and thus reduce the length of the beat. If much uncertainty exists, it is sometimes necessary to include all the pools in the beat.

Unless one accompanies the men oneself they should not visit the kill until the sun is well up and the tiger has in all probability retired of his own accord. Many a blank beat results from impatience to hear the news, and the men, knowing that in the early morning they may encounter the tiger, to avoid this, approach noisily and drive the tiger off. They should approach quietly and merely ascertain the direction in which the drag has taken place. If further investigation is considered necessary, this should only be undertaken by a trained shikari or the sportsman himself.

Having obtained a kill and formed a theory as to the tiger's position, the next consideration is to decide on the general direction of the beat. If in an outlier, tigers usually insist on making for the main forest, and if already there they tend when disturbed to move further in. As a general rule it is better to beat a tiger in the direction he would naturally take, but this is often discounted by difficulty in "stopping" and another line may be preferable which secures an open flank to one side of the beat and which no tiger would cross: or again there may be a convenient ridge of hills suitably situated for stopping. A tiger will

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seldom climb a ridge in the face of stops doing their duty. The following sketch illustrates what is meant.



A. Natural line of retreat but difficult to stop. If the beat, instead of being in the direction A, is swung round in direction B, no tiger will cross the open maidan, and all the stops have to do is to keep the tiger at the bottom of the ridge along which it will travel up to the gun at C.

Having once decided upon the general direction of

the beat, the next proceeding is to select the particular spot for the machan. Inquiries will often show that tigers have been shot successfully from a particular tree, and if past results justify a repetition the sportsman cannot do better than follow suit, especially as the men will then know the local arrangements. On the other hand, they will sometimes take one to a tree which the tiger never goes near simply because some "Sahib" went there once before. It is curious on revisiting a district after many years to find the local people advising a beat in exactly the same way as one originally laid it out with no detail lost. Successful beats of this nature will be handed on as long as tigers last.

If the place has been recently hunted and a tiger fired at, or one out of two tigers shot, it is always advisable, if possible, to move the machan 100 yards nearer the beat, or at any rate to change its position.

Often the hunter has to fall back on his own resources and gets little useful help from the local talent. It is a fatal mistake to be in any hurry in selecting the spot. Often this is fairly well indicated and again it may be a matter of great difficulty requiring the nicest judgment and much knowledge of the habits of tiger. The correct position is of course that in which the tiger walks slowly up to the machan without having been stopped at all, and the person who can hit this off on the face of a huge forest-clad hill entirely new to him has every right to be pleased with himself. No book knowledge can help him ; it is often a matter of instinct based on subconscious accumulations of past experience. Natives are very fond of placing the machan so as to cover the bottom of a nala, and although tigers walk in such places when hunting at night they avoid bare

ground when driven and if they come along the nala it is usually in the cover at the side.

A good place is where the ground admits of both sides being covered from the same spot. Never put the machan with a large open space immediately before or behind it. The outside of a bend in the nala is always a bad place as tiger do not follow these round, but cut across the base, and they ignore small hills, walking straight up and down these and do not stick to the contour. Having once decided on the particular tree, the machan should be tied up. It is a good precaution to bring along a few poles which can be easily tied up and on which the bedstead can rest. While this is being done, the sportsman can place the more important stops on the side where a break is most likely to occur.

On taking his seat, the hunter should see that he has a reasonably clear vision at least in one direction on each side, and twigs and leaves impeding the sight should be removed. Perhaps needless to say, all these proceedings are carried out as silently as possible. The men then depart from the machan and line out as stops. More often than not the success of the hunt depends on these men and faulty stopping accounts for more tiger being lost than any other cause. Some sportsmen place the stops themselves and this is advocated when there is little chance of moving the tiger, but on the other hand there is a risk of this happening and I have known the tiger walk out under the machan when it was empty.

Persons on a shooting holiday often have time to go thoroughly over the beat before a kill has taken place and mark the trees to be occupied. In arranging big shoots such as those of His Majesty the Amir of Afghanistan and of His Royal Highness the Duke of

Connaught, I adopted this plan. Shoots of this nature are instructive to the person in charge, as with all shooting debarred, there is much scope for studying the individual habits of various tigers beforehand, and arranging beats accordingly. At the Amir's shoot, there was one tiger which after killing in the same place lay up in two entirely different jungles alternately.

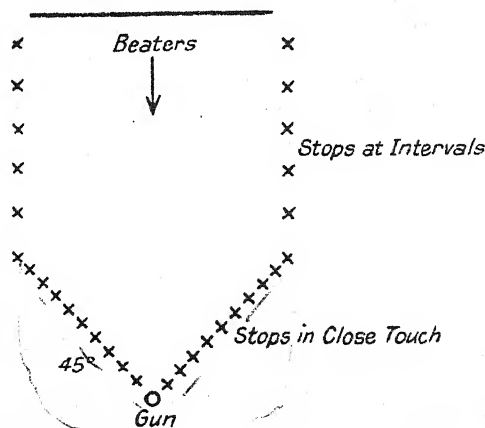
But to return to the question of stops. If there is a shortage of men, it is better to scrimp the beaters, as unless turned, tigers are easily driven, and walk leisurely away from the noise. Long beats are a mistake and if possible should seldom exceed six hundred yards. I have had many successful beats half this distance, and in Chanda amongst fallen clumps of dead bamboos the famous Shikari Antoo used sometimes to locate a tiger and arrange a short beat of eighty yards or so.

Under ideal conditions, the stops extend right from the machan to where the beat commences so that no tiger can slip out at the side without being seen. These conditions, however, are often not attainable and a compromise is necessary. Often, owing to open country in one direction stops can be conserved, but assuming that the likelihood of a break on either side is equal, the stops on both sides of the machan should be placed at an angle of 45 degrees to the gun and in such a way that no animal can pass between them unseen. Men in this formation should extend approximately to the width of the cover it is proposed to beat. They should occupy trees directly opposite leads and likely breaking points, and not to one side of such places. From the end of this line of stops the line should then swing parallel to the direction of the beat, and if men are scarce the interval between

them is extended as the beaters are approached. The stops next the gun should be specially selected men and free from coughs.

When all is ready the beat commences ; the beaters should be lined out so as to cover the country between the line of stops and should remain halted for a few minutes making as much noise as possible. This is to wake up the tiger and avoid his being jumped out of a deep sleep, giving him no time to consider the situation collectedly. It is on his doing this that the success of the beat mostly depends. The men advance slowly, shouting, and at the same time the stops on the either flank keep up a moderate tapping, those next the beat tapping loudest.

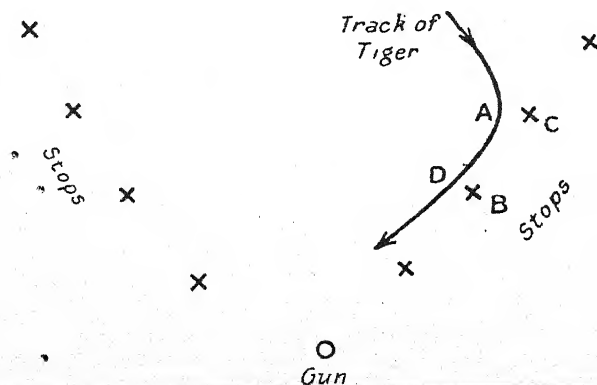
The idea is to convey to the tiger that his only line of retreat is in the direction of the gun and to get him forward in between the two v-shaped wings of the stops.



The question as to whether the stops should tap before seeing the tiger is often debated. I have often tried both plans successfully, but on the whole prefer all except the two or three men immediately

next the machan to make a certain amount of noise. The men next the machan only tap on sighting the tiger. The others in the wings should tap intermittently and those parallel to the beat continuously. On sighting the tiger stops often put him into a gallop, when he escapes or gives a difficult shot. Unless the stops are highly trained therefore it is better to let the tiger trust his ears, when he will often come along exactly midway between the noises on either flank. Too much stopping will make the tiger lie up, when he is apt to break back or come on at a gallop, roaring; on the other hand, if the tiger is trying to steal out he must be turned and shouted at if necessary. Cover is often thick and if the stops are silent the tiger is often not sighted until close under the tree, when to stop him is too late. It is better to try and prevent him approaching the stops by previous tapping.

One of the commonest mistakes is for a silent stop on sighting the tiger to commence stopping too soon and before the tiger has got between him and the gun and by so doing make it break out. The following illustration will show more clearly than words what is meant.



If B commences to tap when the tiger is at A, it will often break out between B and C. In this position C only should tap and B commence tapping when the tiger has got to D. In this way the tiger is led right along to the gun.

The beaters in advancing should keep the line as much as possible. They always tend to club together which is perhaps natural under the circumstances. If the beat is long and there is particular danger of the tiger breaking out at one side, eight or ten of the beaters can be some hundred yards in advance on that flank, but these should come into line with the rest as the machan is approached. When a shot has been fired they should be instructed to remain silent for some time and if no instructions to the contrary are issued, to come on as before.

They are then to assume that there is no danger and there may be other game, or even another tiger, and the sportsman need not give up hope until the last moment, as tigers often come out only a few yards in front of the beaters. I once saw five break almost simultaneously and four were rolled over in a matter of ten seconds. The gun should have his left shoulder facing the beat and the golden rule is on seeing the tiger approaching to slowly raise the rifle so as to cover its approach, taking advantage of the tiger being behind cover to do so, and then to delay firing until he is absolutely certain of killing and not a moment longer. Perhaps, needless to say, if there is any danger the beat must be stopped and the men treed at once, and action taken on the lines indicated in the concluding portion of this chapter.

The actual shooting of the tiger is often an easy matter, being merely the culmination of a well-laid plan; the art and skill consist in formulating and

giving effect to the scheme, and while this is generally a simple matter compared with beating out an old sambar stag, it nevertheless often requires much woodcraft. After having got into the machan and being abandoned by the stops and thus definitely committed to the plan, how often it is that one regrets not having attended more particularly to some special point and how often the tiger escapes in consequence. On the other hand, it may be that the bell of a sambar, the screams of peacocks or monkeys announce that all is well, setting one's doubts at rest, and the thrilling and delightful expectation of the tiger's arrival is the sportsman's reward for all his previous trouble.

Some tigers never lie up near their kills and will baffle the keenest hunters and a tigress with cubs often travels great distances to rejoin them. Other animals consistently break back. I once killed one of this type which had lived in a particular jungle for years. Having arranged the well-known beat on the usual lines and filled the machan with an Indian, I posted myself in a tree on the hillside behind the beat. It was with a sinking heart I heard the beat approaching the machan and the thought that on this occasion he would go forward thrust itself upon me. The tension, however, was shortly relieved by loud roars and a large tiger presently trotted out some fifty yards above me and was shot.

Before treating of the subject of how to deal with wounded tigers, a few remarks on their vitality are not out of place. "A cat has nine lives" and the tiger is the largest, strongest cat in the world. Many almost incredible instances of their endurance under the most frightful wounds have been published, which I can endorse from personal experience of a similar nature. A few may be mentioned. I have known

a tiger receive a .577 bullet which removed a portion of his heart, turn round, and then charge the beaters, who were 100 yards behind and escaped up trees. The tiger died after this effort, but the charge was not in the nature of a wild uncontrolled rush but was a determined effort with purpose in it.

Head shots are not always fatal. The tiger's skull is wedge-shaped with a high bony ridge protected by a mass of muscle and a bullet fired into his face will sometimes travel along the muscle and be deflected by the skull. Only temporary unconsciousness ensues. When gaining experience, I was once nearly killed by assuming that a tiger which was bleeding in the face from the spot which I had aimed at was dead. It lay there apparently dead. It had previously been wounded and had already given me two charges and a great deal of trouble. Thankful that this was now all over, I stepped forward without even reloading the empty barrel, when it suddenly sprang up with a roar and rushed at me. I was lucky enough to get it in the nostrils and did kill it this time, but its dead body, in turning over, struck me in the chest and in turn laid me out for some minutes. I found afterwards that the bullet which failed to kill (a .577) had passed along the muscle close to the bone and rounding the back of the skull was stuck in the muscle of the neck on the opposite side of entry. Entry was just outside the left eye.

I have known a tigress shot through the body in the region of the diaphragm by a .577 to be a nasty active animal to kill eleven days after she was wounded, during which period she had not eaten.

The most remarkable case of all, however, was the very large tiger (9 ft. 10 in. between pegs) shot by His Royal Highness the Duke of Connaught at Supkar in

1921. This animal came out in a beat and His Royal Highness, taking a head shot, to all appearances laid the tiger out : but it recovered and owing to the lateness of the hour escaped for the time being. I was in this tract for some time afterwards and, of-course, made it my business to try and recover the tiger. I got in touch with it seventeen days afterwards and killed it in a pool of water. It had practically been living in water all this time trying to reduce the irritation from maggots which had got into the wound. During the whole of this period, it not only had not, but could not, have eaten anything and although dreadfully thin it was still prepared to charge.

A satisfactory bullet for the large high velocity rifle has yet to be invented and when striking a bone they are apt to fly to pieces. The aim had been excellent and given a low velocity .577 would have dropped the tiger stone dead. As it was, the bullet entered the face on the nose slightly below the left eye and continuing its direction downwards blew out the teeth of the upper jaw and then went to pieces on the base of the lower which it smashed to atoms, lacerating the throat and gullet in a dreadful manner. A consistent bullet would, of course, have ploughed its way down into the chest as well.

The reader will probably be satisfied regarding the vitality of tigers after learning that in spite of this wound and a fast of seventeen days, this tiger was not only alive but still active and going about. In the course of time, death would have, of course, resulted, but how long does it take a tiger to die of wounds and starvation ?

We have now described the hunting of tiger at some length, but one more aspect of the subject

remains to be dealt with, namely, the procedure to be adopted when the animal has got away wounded, and the necessity of taking every measure which tends to eliminate danger. Practically all the casualties which occur take place when following wounded tiger and most of these arise through failure to observe a few simple precautions. The experienced shikari who knows what he is about and pursues his game with a tested confidence in his own abilities and a thorough knowledge of the animal he is hunting, may skip these pages, but it is probable that amongst my readers there are many who will find the problem of how to deal with a wounded tiger more confusing than that of bringing him up to the machan and inflicting the initial wound.

The question as to which is the most dangerous animal in the world is often debated, and in most of the recent literature on the subject the reader is left to take his choice between the lion and the African elephant and buffalo. Most of the works dealing with the subject have been by men with African experience. Indian writers have taken the tiger for granted and his claims have not been pressed.

Both the elephant and the buffalo are harder animals to kill or knock down than a tiger although they present an easier target. I have been told on good authority that a bullet placed in the head of a charging elephant will almost invariably stop or divert him.

Both animals are very large and have nothing like the powers of concealment possessed by a tiger, and thus, to a large extent, the danger of a surprise attack from a few paces is eliminated. Moreover, when it does come, it is comparatively slow and admits of an active man having some chance of avoiding it. No such chance exists with a tiger.

Royal Highness the Duke of Connaught

The method of following up wounded elephants and even buffalo mentioned by Selous and others, if adopted with tiger, would entail certain death. Selous once even sent a man to head and drive back a wounded bull elephant, which he did! Fancy asking a man to do this to a wounded lion or tiger. The aspect and size of the elephant and buffalo are apt to be terrifying and it is probable that this is confused with danger. The impression conveyed on the sportsman is not necessarily a true criterion of the actual danger involved. Selous, the greatest living authority of his day, and a man who possessed a calm judgment and unshakable nerve in the face of danger, gave pride of place to the lion: *a fortiori*, therefore, to the tiger, as not only is the tiger a larger and more powerful animal but it is one which is never found except in country which, according to African classification, would be considered heavy cover, whereas lions are often found and hunted in comparatively open country. Given the same conditions of habitat, there would probably not be much to choose between the two animals, and the fact that unwounded lions will charge more readily than unwounded tigers would make the lion the more dangerous animal of the two. As it is, however, the most dangerous performance in the world which a sportsman is called upon to do, is to follow up the trail of a wounded tiger.

Another aspect of the case is that the tiger and the lion are animals accustomed to attack and kill other animals—they are specially equipped for doing this. They are trained in concealment, are expert stalkers with specially developed senses and weapons of offence. Elephants are proverbially blind, and neither this animal nor the buffalo, provided the wind is studied, are difficult to approach unawares.

The hearing of tigers is so acute it is absolutely impossible to approach a wounded beast without being detected. Moreover, these animals when they charge often blunder past and even when they get home on the sportsman, owing to their not being habituated to attack, often fail to make good their purpose, whereas once in the clutches of a tiger, if not killed outright, the sportsman has the certainty of only avoiding death from septic poisoning by the skin of his teeth.

It is probably correct to say that in a decade there are more casualties to sportsmen and more persons are killed by tigers in India than there are by lion, elephant and buffalo combined. Most of these casualties occur in the Central Provinces or where elephants are not available.

When a tiger charges he usually comes on with a sudden rush, bounding from a short distance and announcing his intention with two or three deep awe-inspiring coughs or grunts, and the sportsman, knowing he is being charged, often without being able to see the tiger, has the nerve-shaking experience of awaiting a view. What he eventually sees is an enormous head which seems to be coming straight at him and at the same time rapidly increasing in size. At times the whole body seems to be masked by the head.

In 1916 the number of casualties which took place, and which included a lady (the only instance of its kind of which I have ever heard), led to my being asked to draw up a few simple rules regarding the precautions to be taken when tiger shooting. Under the above title, the note I drew up was published in *The Indian Forester* and an extract from the same was printed by the Local Government. The intention was that all persons receiving permits to shoot in tiger country should be supplied with the information given in this

extract, and it was hoped by these means to reduce the casualties, many of which were obviously avoidable. The following pages adhere closely to what I then wrote, and in no case in the light of further experience has it been thought necessary to alter in any respect the purport of the advice then offered.

It will be the experience of most sportsmen when wandering in the jungle to come across a tiger occasionally. Under such circumstances, any one with the slightest enterprise has a shot, and in most, the paramount idea would be to bag it, apart from merely firing.

In most cases the tiger will turn tail or bolt or attempt to slink out of sight; under these circumstances, there is practically no danger in firing, and a hurried or unaimed shot can be taken without serious risk, and such a shot is often the only shot possible. There is also little danger in following up the tiger before one has fired: the intention of the tiger is to get away.

Occasionally, however, the tiger will assume an attitude which shows that his mentality towards the sportsman is such that he expects the latter to give way to him.

Shooting under these circumstances is attended with risks. Usually the greatest deliberation can be taken over the shot, and no hurried concern lest the tiger should be off need disconcert the sportsman's mind: in fact, the more careful and deliberate the aim, the greater the safety and the more likely the death of the tiger.

An animal when suddenly fired at at close quarters, puts itself in motion and the first rush is often in the direction in which the body is pointing at the time: the muscles come into play before reason controls the

direction of the motion. It is advisable, therefore, when the tiger is directly facing one, to avoid firing unless one is sure of being able to kill or cripple: this rule applies equally whether the animal is aware of one's presence or not. As soon as the animal turns aside, a shot can be fired with comparatively little risk. The same applies to a tiger which is approaching in a line which will bring him past the sportsman slightly to one side: there is considerable risk in firing while the tiger is still in front. A fair balance between eagerness to shoot and safety is to allow the tiger to approach to a point opposite the sportsman: further safety can be ensured by allowing the tiger to pass. It is rare for a tiger when wounded to bolt and then change his mind and turn round and charge, but I have known this happen.

The number of persons who shoot tigers off elephants in these Provinces and the number of times in which dangerous charges take place are so few under these circumstances, that few remarks on the subject are called for. It is only necessary to caution the sportsman that when crossing a narrow steep banked nala he is liable to attack and the tiger can then spring on to the pad with ease; moreover, under these conditions, the man and not the elephant is his object. Special precautions therefore are necessary in crossing such places, and on no account should the elephant ever be driven along the bottom of a nala of this type.

To illustrate what can happen, I may mention that on one occasion in hurrying to the assistance of a man who was being mauled, I had perforce to expose myself in this way. I came on the tiger lying on the top of the bank on my own level and got in a shot at once which raked his forearm and blew out one of his eye teeth.

The shock upset him and he started to bolt. It is rare for an animal to change its mind and it generally pursues its course until it has lain down, when if again disturbed a new situation arises and it may then act quite differently and charge. This tiger, however, apparently struck with the ease with which I could be attacked, sitting as I was on a pad flush with the bank and only a few feet off, changed its mind and after going twenty yards whipped round and gave me a most dangerous charge. Luckily I had reserved my left barrel and this tumbled the tiger down under the elephant's belly.

I cannot recollect a case in which a sportsman has been mauled when getting down out of a machan at night. Provided one's men can approach the tree, it is usually safe to descend and retreat with them: under circumstances other than these, the sportsman who prefers to return to camp, rather than spend a cold or hungry night in the tree, does so at his own risk.

Personally, I have always preferred to return to camp and only consider that I was in danger on one occasion, although on two occasions I certainly would not have left the tree unless an elephant had fetched me. Curiously enough, the tiger which made itself so unpleasant had not been fired at. It spotted me in the machan and went off and bathed in a neighbouring pool. I shouted for men with lamps to come up, when the tiger left the pool and demonstrated preventing their approach. They were in a field about three hundred yards off. The tiger presently returned to the pool and not wishing to spend a cold and supperless night, I descended quietly, but not so quietly as to escape the tiger's notice, who accompanied me in the jungle alongside the path up to the clearing, growling and

demonstrating the whole time. It was a horrible experience and one I hope never to renew, and I only just retained sufficient control not to break into a fatal run. I shot this tiger shortly afterwards and many moons previously someone had driven a Martini Henri bullet right through him, which may have accounted for his peculiar behaviour.

The great majority of accidents occur in following up wounded tigers on foot. It is practically impossible to lay down rules which will meet all cases: so much depends on the psychology and skill of the individual, and the nature of the terrain in which the hunt takes place: nevertheless, the following general principles apply.

"The essence o' strategy bein' forethought, the essence o' tattics is surprise."—*Kipling*.

In the hunt strategy lies with the shikari and tactics with the tiger. The precautions to be taken are chiefly aimed at the elimination of surprise. A straightforward charge with the shikari warned and prepared for it and which gets home, merely indicates that the sportsman is not sufficiently skilled with his weapon for the position in which he has placed himself, and no rules can deal with this. However, good shots and experienced shikaries can be rushed by the surprise and suddenness of the attack.

Some knowledge of the nature of the wound inflicted is the first information to be gathered, as it helps to indicate the likelihood of being attacked* and the nature of the attack when it comes. A blind "tucked in" rush forward, immediately after the shot usually means a death shot, often in the heart, and the animal drops at the end of his gallop. A blind rush is one in which trees and thickets are blundered into. This

must not be confused, however, with a shot through the paw or low down in the leg. In this case, after a bound or two, the tiger often gallops wildly forward and makes a very similar rush as in the case of a heart shot, but the action is neither "tucked up" nor short, and the rush is not "blind." If not apparent when the rush takes place, a short follow up usually discloses its nature. An animal wounded in this way is usually very dangerous.

Large quantities of blood often indicate a superficial wound: in a dangerous wound which has penetrated the body most of the bleeding is internal. Stomach wounds show very little blood. Mere muscle wounds often show considerable blood to commence with, but rapidly dry up. Other indications of where the wound has been inflicted are pieces of bone, intestine, or liver: froth and blood indicate a lung wound. Blood on each side of the trail shows that the bullet has passed through the animal and the position of the blood on grass indicates the height of the wound.

A tiger, whose back has been broken, is practically helpless; nevertheless, it is a golden rule to look upon any tiger which shows the slightest signs of life as a highly dangerous animal, and lead should be poured into it until all signs of animation have ceased, and this rule cannot be too strongly impressed on the sportsman, who often has an opportunity of finishing the tiger when still in his machan, but hesitates out of consideration for the skin for which he may subsequently risk his life. It is a fairly common occurrence to see a tiger's tail waving perpendicularly in the air, the tiger lying on the ground at the time. I have never known this not to be a sure sign of death. A tiger shot through a limb frequently seizes the paw of that limb and bites it through. Although they

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will do this when mortally wounded it usually indicates that they still have a good deal of vitality left in them.

A wounded animal may be dangerous to follow up by reason of the wound being so severe as to make it almost certain that he will not try and escape, in spite of the fact that such a wound probably cripples him to some extent in his charge: on the other hand, the wound, if permitting the animal to make strenuous efforts to escape, will be no hindrance to his charge when it comes. The following is probably the order of "danger" with relation to the wound inflicted.

(a) A stomach wound: it usually makes the tiger very angry and is no impediment.

(b) A shot through the paw or a broken leg low down: the nature of the wound makes him disinclined to escape and it has surprisingly little effect on the speed of a short rush.

(c) A muscle wound: the tiger is often very little affected, but it does not make him nearly so angry as in the case of a stomach wound.

(d) A shot in the liver practically no impediment to the charge, but the tiger is drowsy and disinclined to move: given time, he will die.

(e) A shot which has shattered one of the limbs high up: such a wound is usually a serious impediment to the charge.

(f) A lung shot: the tiger is very disinclined to move and avoids going up hill.

(g) A broken back: the tiger is practically helpless.

It is unusual to have wounds (e) and (f) inflicted without their at the same time being deadly, although death may not immediately supervene. It is always a wise precaution therefore to wait some time before

following up, but here again we are "up against" the temperament of the hunter, whose actions will be directed by the strongest impulses, and increased danger will often be less intolerable than the anxiety and irritability induced by waiting.

Most tigers shot in the Central Provinces are killed from machans, either by sitting up, or in beats.

In the former case and supposing the animal to have got away wounded—and we will assume it is getting dusk or even dark—the wisest course is to come away at once and postpone the hunt till the next morning. It is very probable the tiger may have died. If the tiger has gone some distance to find water, he is probably not mortally wounded and he is very likely to be found in the vicinity of the water, which should be approached with extreme caution and from above, giving special attention to all dense cover in the vicinity. A good plan is to surround a considerable area round the water with men on trees and gradually contract the ring. The tiger is almost sure to be sighted and can be killed in comparative safety. If the tiger has made no attempt to reach water, he is very severely wounded and is probably dying. He will be very disinclined to move and will not tolerate being shifted far; in fact he will often only shift once. The above remarks only deal with the special conditions arising out of the fact that the tiger has been wounded some twelve hours previous to being followed up. Most of the precautions however enjoined in what follows are equally applicable.

We will assume that a tiger has come out in a beat, been wounded and gone through, a very common occurrence in these Provinces.

If men can be trusted and spared, it is a great convenience to have three or four posted beforehand

in trees as markers well behind the beat, say at intervals of 100 yards. They can generally give one most valuable information, the tiger may have lain down before it reached them, they may have seen it die or lie up, in which case it can often be surrounded at once by men in trees and shot from a tree with safety. If the tiger has not reached the markers, then the area between them and the machan can be similarly surrounded. If the tiger has gone past the markers, some information regarding the nature of the wound can generally be given.

Assuming that the latter eventually has taken place, and that a long and strenuous hunt is before the shikari, I propose to indicate the average difficulties that will be encountered and the general precautions to be taken. The hunter must bear in mind that his primary object is to locate his tiger, not merely to come up with it. If the latter alone be his object, it either results in the tiger escaping or being killed with the maximum risk to the hunter. By locating the tiger is meant that it is known to be inside a particular patch of jungle which is so surrounded that it cannot move away without being seen. This stage should be reached, if possible, before any attempt is made to kill it.

When hunted, tigers naturally lie up in cover and avoid the open, but cover is a relative term, and consists of nallas, jungle, rocks, grass or any combination of these four,—in fact, any spot which is more "concealing" than the general average of the surrounding country. Such spots, therefore, should be approached with extreme caution, a position should be taken up which gives the hunter an advantage, i.e., beside a stout tree or on an eminence: the cover should then be stoned before advancing—a stone landed near

the tiger will produce a growl or he will slink off or he may charge : in the latter case, the shikari is prepared. In thus following up a tiger, only three or four men, whom one can control and more or less trust, should be taken. More than this is a nuisance and a source of danger ; a considerable body of men can be brought on quietly some hundreds of yards in the rear, as their co-operation will probably be required later on. The sportsman should not attempt to track himself, he should quarter the ground slightly in advance of the trackers and his duties are to defend and protect all concerned from unnecessary risks. Strict silence should be enjoined so as to give one every chance of hearing the tiger.

It may be here as well to mention that such a hunt usually commences with great caution : during the first hour every precaution known to the hunter is taken and every sense is fully exercised—not only exercised but stretched to the utmost limit—until nervous exhaustion supervenes, precautions are reduced and the trail is followed with an indifference that was unthinkable in the first few hundred yards. The hunter is, therefore, warned to guard against this by conscious effort. Failure to observe this rule is one of the most frequent causes of fatal attacks.

To return to the hunt, however ; assuming that blood and flattened grass show that the tiger had lain down and has been moved : it is necessary to approach the next cover with extreme caution : most tigers will move once but many will refuse to move more than once : much depends on the nature of the wound. If the cover towards which the tiger has moved is good and the wounds indicate that he is not likely to have gone far, some men should be called up and the area circled before proceeding. It is impossible to give all the pros

and cons which would decide a hunter to apply this process to a particular patch of jungle, but these are often fairly clearly indicated if it is borne in mind that the object is to locate one's tiger before attempting to kill him.

A tigress is more likely to demonstrate but is more easily moved or turned than a tiger: a tiger, if he has once demonstrated, is more likely to charge and charge home, than a tigress.

Assuming that one has located one's tiger, the men should circle the area in trees and the circle should be gradually contracted on the safest sides. The shikari can then climb a tree on the side the tiger is most likely to move to and men can stone the jungle from the other side. If one does not see the tiger oneself, someone else does, and, as soon as the tiger lies down, the man who sees him can be joined. This is the safest and simplest method of finishing off a wounded tiger. The most difficult terrain in which to carry out this operation is flat country, with a dead level of cover, but such areas are happily not very common.

Great caution should be taken in crossing a nala: the tiger often lies down on the top of the opposite bank, which should be well stoned before descending to the bottom. Do not follow the trail along the bottom of the nala, keep along the top and let the man spoor along the bottom behind. Unless it is a steep narrow straight cut nala, generally of the alluvial type, the tiger is not likely to be in the bottom of the nala. In this case, one may come on him suddenly round a bend; one should keep, therefore, to the top of the nala on the opposite side to that on which he is likely to be and somewhat ahead of one's men.

Hills, especially steep hills, "take it out of" wounded animals. A tiger that is going to die shortly will

not go up a steep hill. A wounded animal is very apt to lie down on the face of a hill as it tires him, or, if it is a short hill, just on the edge of the top. A tiger is much more likely to charge down hill than up, and when he does so he is much more difficult to stop. Never follow a blood spoor up a steep hill or ravine side. Put some men in trees at the bottom as markers, go round and come down from above stoning the ground in front. One can often shoot the tiger with comparative safety from above or he can be driven into the bottom of the ravine and located. Moreover, if he charges he is fairly easy to stop and the sportsman is steady by reason of the confidence his superior position gives him.

Few tigers will seize a man in their stride; if the man stands still, they pull up dead at his feet and then proceed to bite and claw; in a charge, therefore, stand still; there is nothing so fatal as to move and it often results in a fall. Reserve one's shots, especially the second barrel, until the last moment.

Buffaloes are sometimes used in hunting wounded tigers. It is a process, however, which is attended with considerable risks to all concerned. The tiger is apt to work round the ends of the herd and seize the herdsman who operate on the flanks and the animals get so excited they are quite likely to charge the shikari. Their use is, therefore, only advocated in certain circumstances. Assuming that one has located one's tiger, but, by reason of lack of trees or the density of the cover (such as is often found in frost hollows full of tall grass) it is found impossible to shift or sight him and to enter the cover would be practically to commit suicide, buffaloes or even cattle can be employed with effect. They should be rushed into the cover without giving them much time for

deliberation ; in fact, this is the only method possible with cattle. The tiger may shift and may be shot while doing so, or he will spring on the back of an animal, when the sportsman has to run in and shoot him. Where the necessity of employing this method arises, the sportsman is warned that he is undertaking a highly dangerous performance.

In following wounded tiger, a good pack of dogs is invaluable, as they will locate and bay the tiger and will so engross his attention that the risk of being charged is much reduced. On the other hand, if he does determine to charge, the dogs are no sort of impediment and are brushed aside like flies. Most sportsmen would not possess a pack, but many might own a fox terrier or some other animal of European breed. In hunting a wounded tiger, these should always be taken, as even if they do not possess sufficient courage to bark at the tiger from a distance, their behaviour will often indicate that the tiger is close at hand. Greyhounds and "long dogs" or village Pis are however useless for this purpose.

A concluding word may be said on weapons. These should consist of the heaviest double-barrelled rifle the sportsman can conveniently handle, and, if a tiger has been wounded with a small bore, the arrival of a heavy weapon should be awaited before any attempt at the following up is made.

Summary of rules and precautions to be taken so as to reduce risks in tiger-shooting :—

General.

1. Most accidents occur through surprise attacks.
2. In following up a wounded tiger, let the shikari have as his object the locating and surrounding of the tiger before attempting to kill it.

3. Do not follow blindly along the trail with the chance of stumbling on to it : in this case, the tiger will move away until he makes up his mind to make his own attack at his own moment.

4. Wounded tigers lie up in cover which consists of nallas, jungle, rock, grass or any combination to these four : in fact, any spot which is more concealing than the general average of the surrounding country.

5. Approach all cover with caution and stone it before entering, taking up a position of advantage beforehand.

6. A wounded tiger cannot be moved indefinitely from cover to cover : sooner or later he will turn.

7. A tigress will shift more often and more easily than a tiger and is less inclined to charge home.

8. All tigers charge down hill much more readily than up and are much more difficult to stop when doing so.

9. Look upon all tigers which show the slightest signs of animation as dangerous animals and continue firing until all such signs have ceased.

10. All wounded tigers are dangerous ; more so, according as the wound is situated in the stomach, low down in a limb, a flesh wound, the liver ; less so, high up in a limb, the lungs, the back.

11. In following a wounded tiger, study all indications which show the nature of the wound.

12. Do not attempt to gather a wounded tiger at night or at dusk : wait till next day.

13. If charged, stand still and reserve fire to the last moment, especially the second barrel.

14. *Shooting on foot.* Avoid firing at a tiger whose body is directed towards you unless you are sure of your aim : as a precaution, allow him to turn to one side.

15. If the tiger is coming towards you, unless sure of your aim, allow him to get to one side, or even past, before firing.

16. *Sitting up over a kill.* At night, if the demonstrations of a tiger prevent one's men coming to the foot of the tree, the sportsman who descends and returns to camp does so at his own risk.

17. A tiger which has been wounded over-night and has gone any distance to water will probably not die immediately and is probably near the water.

18. A tiger which has been wounded over-night and has made no attempt to reach water, is probably mortally wounded. He will not tolerate being shifted much.

19. *Beats.* When a tiger comes out, remember general rule 9, and thus, if possible, avoid a dangerous follow up.

20. If trustworthy men can be spared, have three or four men in trees, at intervals of 100 yards behind, to act as markers.

21. If there is time to do so and your temperament permits, delay some time before following up.

22. Select three or four of the best men only to accompany you. Others can follow at a distance behind. Insist on silence.

Following up wounded tiger after the beat.

23. Do not attempt to track yourself, look out for the tiger instead.

24. Remember the general rules, especially 2, 3, 4, 5, 6, 7, 10, 11 and 13, as they will almost all be applicable at times.

25. If the tiger growls or shows up in any way, put a man up a tree; he can often see it and can be joined.

26. If the tiger has been located or there is a strong probability that he is in a particular cover, surround it with men in trees, get into a tree covering the most likely break and have it stoned out from the safest side. Men can advance with comparative safety from tree to tree after stoning, provided some remain up as markers.

27. Stone the opposite side of a nala before crossing.

28. Do not follow a trail down the bottom of a nala, stick to the edge of the bank opposite the tiger and in advance of the trackers.

29. Never follow a wounded tiger up a steep hill or ravine side. Put men in trees at the bottom, go round and come down from above. (See general rule 13.)

30. Be particularly on your guard against relaxing precautions after the hunt has proceeded some time and exhaustion has set in.

31. Use buffaloes or cattle to drive out a tiger located in otherwise impossible cover.

CHAPTER V

LEOPARDS OR PANTHERS

The panther or leopard is the most widely distributed animal found in India. Lydekker gives its distribution as including "the greater part of Africa, Asia Minor, the Caucasus, Syria, Palestine, Persia, Baluchistan, Afghanistan, a large part of Central Asia, India, Assam, Ceylon, Burmah, the Malay Peninsula, Siam, China, Manchuria, Java and Sumatra."

From this it will be seen that it is found in most parts of the old world lying to south and east of the Mediterranean. As is to be expected, an animal having so wide a geographical range varies considerably in type.

Typical African specimens can be distinguished from the Indian animal by having the spots closer together and smaller, especially on the fore-quarters, rosettes only appearing from the shoulders backwards.

An intermediate longish-haired race inhabits Persia and surrounding countries.

A powerful heavily built long-haired leopard is found in Manchuria, bearing much the same relation to the Indian leopard as the Manchurian tiger does to the Indian tiger.

Blanford writes of the Indian leopard as follows: "The size of the animal, the number, form and closeness of the spots, and length of tail, are all extremely variable characters." Truer words were never written, and owing to this variability, from time to time attempts

have been made to establish two distinct species, and one fairly recent author even went so far as to state that there were as many as three. This statement naturally led to the question being re-opened, and as soon as the matter was critically examined it was found that the theory did not rest on any solid foundation. Investigations merely to refute error seldom increase knowledge, but in this case the results have been useful, and the differentiation between the leopard and the panther has probably been now buried for some time to come.

Blanford might even have laid more emphasis than he did on variation in size, as mature animals not much bigger than the largest of cats up to animals which bear comparison with small tigers are sometimes met with. The great mass of leopards, however, develop into animals between these two extremes. Purely jungle leopards, those living entirely inside the forest and never resorting to open country and villages, are often of large size and adopt the habits and ways, and to some extent the colouration of tigers. They have yellow fawn coats, relatively fewer spots and rosettes, and are distinguished by the jungle tribes as "gol baghs" or spot-tigers. The smallest leopards are usually village adjuncts, and the intermediate class are partly village and partly jungle animals. The requisite variation in order to establish a distinct species is a definable difference constantly transmitted, and out of all the leopards I have seen I have come across nothing which would stand this test. The appearance of the leopard is too well known to require detailed description—it is sufficient to say that amongst world types the spots of the Indian type of leopard are more consistently arranged in rosettes.

Melanism is fairly common in the moist dark forests

of Southern India and Malaya. These black leopards are not a distinct race and a black cub has been found in a normal litter. Cases of melanism in the Central Provinces are rare. I have only known of two black leopards having been killed in the last twenty years. A well-known black leopard lives in the neighbourhood of the Gugumal Plateau of the Melghat. It had been there for years before I went to the Melghat in 1912. On one occasion, close to camp, it walked slowly across a fireline about 20 yards off. I got a perfect view of it, and instead of being black, as generally supposed, it was a dark chestnut with the spots showing up as black shiny surfaces. It was evidently a male of the largest size, not much smaller than a young tigress. Some day it will be killed, and if the lucky sportsman happens to possess a copy of this book he will learn that I saw this animal in 1913.

The size of ordinary adult leopards varies from 5 ft. 4 in. to 7 ft. in length, and from 60 lb. to 130 lb. in weight. A fair average male leopard measures 6 ft. 8 in. and weighs 110 lb. The large jungle-loving animal which for convenience sake I shall refer to in future as the "gol bagh" is anything from 7 ft. 2 in. up to 7 ft. 9 in. A fair average specimen I killed measured 7 ft. 5 in. and weighed 152 lb. It will be seen from these statistics that the leopard bears no comparison with the tiger in bulk, and is a light-boned slim animal; what he loses in bulk however, he makes up to some extent in activity.

Various measurements and weights have been published from time to time. Amongst others a number of figures are given by Col. Burton in the *Bombay Natural History Society's Journal*. These measurements and the proportion of body to tail generally agree with those made by myself, but without calling in question

for a moment the accuracy of the weights given, my weighments make the animal considerably heavier than he does. A possible explanation is that many of the animals I have killed have been essentially jungle animals or "gol baghs." Some of Col. Burton's animals were killed in Buldana District, which I have also hunted, and it struck me at the time what poor physique the leopards had considering their length. A great deal also depends on whether the animal is gorged or not when weighed. The total length of a leopard often conveys a wrong impression as to its size, as the length of the tail bears little or no relation to the size of body, and I have seen some diminutive leopards with immense tails, and again a large beast may have a short one. Compared with a tiger, the leopard's tail is proportionately longer. The shortest and longest tails I have measured have been 28 in. and 38 in. respectively. The vertebrae in the tail have been recorded as varying between 22 and 28. Like the tiger, they carry a rudimentary collar bone.

✓ Leopards will inhabit scrub jungle or any broken or rocky country; even a nala surrounded by cultivated ground suffices for shelter. Unlike the tiger, they are not dependent on a fairly large tract of forest. They are also much more tolerant of the sun, and appear to have always belonged to the country. Like the tiger, they prefer an evening and a morning drink, and although they can swim well if put to it, they are not given to lying in water, and avoid wetting themselves. Leopards breed at all times, but I have come across more cubs in April than at any other time. Two to four are usually born and the male generally remains with the female throughout. In fact, leopards generally are more conjugally inclined than tigers, and

are not so solitary. Three or four leopards will sometimes be seen together.

The period of gestation has been variously stated as twelve and fifteen weeks; the former figure is probably more correct. The cubs are born blind and the spots are indistinct, as before the body has expanded the spots are almost merged; these separate as the animal grows. The cubs are seldom deposited in the open jungle. A cave, overhanging rock or a porcupine's earth is generally chosen for a home, and even when not breeding leopards inhabit such places. Leopards have a strong maternal instinct, more so than the tiger, and I have known them charge wickedly in defence of their young.

✓ As already stated, the great mass of leopards are semi-dependent on villages, and certain animals may often be said to more or less belong to a group of villages.

Their food is exceedingly varied and consists of almost anything they can catch and master. This includes sambar, nilgai, and all the larger deer and antelope except bull nilgai and stag sambar and barasingha. These I have never known killed by leopard, simply because few leopard are big enough to tackle them. They kill sows and small pigs, cattle, calves, donkeys, ponies, young buffaloes, goats, sheep, dogs, jackals, black buck, chinkara, four-horned antelope, barking deer, mouse deer, monkeys, hares, peafowl, jungle fowl, porcupines and even crabs, snakes and lizards—a fairly comprehensive menu.

Their relation towards porcupines varies, as although they will kill and eat these, I have known them occupy the same earth apparently on relations of mutual trust. Porcupines are the great excavators of the jungle and their disappearance would affect the lives

of a number of other creatures. It is possible, therefore, that the leopard occupies the porcupines' earth on some mutual understanding backed in the early stage of the *pourparler* no doubt by the latter being able to prevent entrance by presenting an unassailable row of bayonets. An extraordinary case has been recorded in the *Bombay Natural History Society's Journal* of a porcupine attacking a dead leopard and filling it up with quills. Leopards also come into relationship with wild-dogs. These latter will hunt and tree a leopard, and if they could get at him, I have no doubt they would kill him.

Another animal which comes into the leopard's life is the hyena. He will often annex the leopard's kill, and I have known them not only prevent the leopard coming up, but even to attack him on the kill and drive him off. The leopard seems to recognize his master, and this is the more curious as they will readily kill a dog as big as a hyena.

I heard of a case recently in which a hyena chased away a large leopard and prevented the shikari from getting a shot, who in default killed the hyena. This was unnecessary, as a cartridge chucked at the hyena will disclose the presence of man, these animals having excellent noses. The hyena on smelling the cartridge will slink off, and the leopard seeing the coast clear will return and can be shot. In addition to man, leopards are killed and eaten by tigers and crocodiles, and leopards in country where tigers are numerous seem to be conscious of their danger; at any rate in such places they more frequently drag their kills up into trees and devour them there. I have even seen a full-grown barasingha hind up in a tree entailing a great effort and implying a definite purpose and not instinct; and as it could have been more easily pro-

tected from vultures in the long grass, this cannot have been the object in view.

In killing their prey, leopards usually seize the animal by the throat and hang on until death by loss of blood and strangulation ensues. They will often clasp the animal round the shoulders with their fore paws as well. The remarks made on the subject of tigers sucking the blood of their victim have a very similar application to the leopard, and I have never seen them make any attempt to do this. As, however, it is only the largest leopards that can break an animal's neck in the masterful way a tiger does, the throat is often worried, and a considerable amount of blood sometimes flows out before circulation ceases and leopards will lick this. This action on their part is quite different however from the impression one gets from many authors. The long time they often remain fastened on to the throat is not for purposes of sucking, but is necessary in order to give the animal time to die. The fangs are buried in the flesh more or less closing the holes they make; moreover, the part of the skin opposite the spot where any suction could act is unbroken.

They will attack animals they cannot master. I once saw a small leopard attack a fair-sized buffalo. I was sitting up for tiger. The attack continued at intervals most of the night, and the buffalo, although tied up, had no difficulty in beating it off and was little the worse.

Leopards depend on the suddenness and secrecy of their onslaught, and if discovered before they get home they will often turn tail and abandon the attempt. I once saw a billy-goat, which otherwise would certainly have been killed, lower his head and come to the charge, when the leopard fled. I know of a case in which a goat actually charged and overthrew the leopard.

The "gol bagh" will often kill his victim exactly like a tiger. I have known buffaloes of a size which a small tigress might have hesitated to attack, get their necks broken as neatly as any tiger could have done it. Animals of this type commence to eat behind, between the buttocks just as a tiger does. Ordinary leopards tear open the body and commence on the viscera, ribs and fore quarters; they also drag and conceal their prey from vultures.

Leopards are less nocturnal than tigers and will move about or even hunt in the middle of the day, but the generality of animals commence hunting at dusk, prowl about all night, and retire in the morning well after the sun is up. In hunting, they depend chiefly on their eyes, consistent with the more open country they hunt, as compared with tigers. They have better eyesight than tigers, and apart from their being more liable to look up, they can pick one out from one's surroundings more easily than a tiger can. Their sense of hearing is exceedingly acute as well, probably only a little less so than the tiger's. This sense, however, is secondary to eyesight in hunting. In the tiger; the importance of the two senses is reversed. The leopard's sense of smell is poor, but better than the tiger's, and I have seen them using their noses.

Like the tiger, they possess very strong instincts, but they are distinctly more intelligent. This can be explained by the variety of their food, and the expedients necessary to procure it. Their constant association with man, whose ways have to be studied, is also educative. In spite of, or perhaps because of, these attributes, they make most unsatisfactory pets and are inconsistent and lacking in reliability. The tiger, with little beyond his instincts to guide him, has a stability not possessed by the leopard and his quiet

dignity of character makes him an infinitely more desirable pet than the versatile leopard.

The behaviour of leopards when performing the functions of nature is similar to that of the tiger, and they sometimes scrape bare patches without using them. They also occasionally scrape their claws on trees. The behaviour of the leopard follows no rule. At times he can be bold to rashness, and at others timid to a degree. Instances of this are numerous and varied, but as they disclose little of character, except courage or the want of it, need not be retailed. At night, of course, their boldness increases, and they will enter huts and sheds. I have even had one enter my tent, evidently after a terrier, and on one occasion when asleep in the open, a fox terrier which was actually sleeping on my feet was seized and carried off.

They possess extraordinary powers of self-control. I have trapped numbers in large steel traps of the cruellest nature. These traps used to be set close to camp, and beyond the clack of the closing jaws, nothing would be heard. The leopard would silently and deliberately try to free himself. The conduct of the cats as compared with dogs and other carnivoræ when trapped is striking. A hyena and a bear advertise to all and sundry that they are in trouble.

My dogs used to draw my attention to a leopard having been caught, otherwise I should often not have known until morning. On one occasion, on going out with a stable lantern, I found the leopard gone. A large animal had been caught and he had inserted his other fore paw and bent the iron jaw back. It has always been a matter of regret that I did not have the jaw bent back under conditions which would have shown the force expended, as the amount of strength shown on this occasion appeared to be incredible.

I can quote other instances of self-control. Amongst others, I see recorded that in a tiger beat in Chanda, when it was obvious that no tiger was present, a small leopard came out. Firing with a .577 rifle, I blew a large portion of its entrails out. The leopard never even broke step, and finding the entrails an impediment, removed a portion thereof and continued to walk on. I watched these proceedings with astonishment and eventually had to give it another barrel.

Leopards can run up any tree, and no doubt they constantly allow a beat to pass under them in this way. In a tiger beat I have seen a leopard climb a tree several times to have a look round. The tree tops were bare and did not admit of concealment. He was evidently aware of the presence of the tiger, and his chief motive in climbing was to locate the tiger before moving further along the ground. In descending a tree, unlike the bear, they walk down head first. The former animal descends tail first.

They hunt monkeys in trees. I once came on two leopards engaged in this occupation. The monkeys (Langoors) were in a large Pepul (*Ficus religiosa*) tree about 100 yards from the edge of the jungle. My attention was first directed by the behaviour of some of the monkeys who leaped from the top of the tree to an outer branch and thence on to the ground. They were not "swearing" but silent with fear. One leopard was on the first branch, and another well up the tree. Unfortunately they became aware of my presence and bolted, dropping the curtain prematurely on a very interesting scene.

Langoors when hunted lose their heads and behave in the most foolish manner. There seemed no reason, given a little intelligence, why the monkeys should have left the tree, but to accomplish this was their

evident intention. I have noticed the same behaviour when attacked by dogs, and instead of remaining in trees where they are safe, they will descend and bolt as if they were unable to endure the proximity of an enemy, this apparently being wrongly associated with imminent danger. They behave in this way in jungle. On more than one occasion monkeys in thick tree forest have abandoned the tree tops and been run into and killed by my dogs. The phenomenon is inexplicable except on the ground that the monkeys' reasoning powers are benumbed. This is not an article on monkeys, but these facts are quoted to show that it is probable a leopard can generally procure a monkey when he wants to.

Monkeys, and all the deer given to uttering cries of alarm at tiger, habitually do so also at the leopard. Many birds also advertise his presence or chatter on seeing a leopard; amongst others may be mentioned plover, peafowl, crows, and babblers, and the two latter will even follow him along the tree tops cawing and chattering to his intense annoyance. Squirrels and tree shrews will also chirrup and demonstrate; in fact the whole jungle becomes articulate in the vicinity of a leopard on the prowl, and the hunter is apprised of his presence in many different ways.

Young leopards are given to making a hoarse grating "meow." When wounded or angry they will often growl as a preliminary to charging. When charging at the gallop, they give two or three deep short coughs very similar to the noise made by the tiger, but of less volume. Another method of attacking is to glide in *ventre à terre*, in doing this they generally growl.

Following up wounded panthers on foot is highly dangerous, as they will often charge, and the same precautions are necessary in dealing with a wounded

panther as those advocated for wounded tiger. I have known a leopard descend the opposite side of a hill on fairly bare ground and come on at a gallop across a nala from a distance of 150 yards, a procedure I have never seen adopted by a tiger. Most attacks, however, are delivered at close quarters.

The question as to which is the more dangerous of the two animals has often been asked, and first place is often assigned to the leopard. The leopard being smaller is more easily concealed and presents a smaller mark. On the other hand, he is much more easily stopped. Moreover, he is not a large animal, and a powerful man, determined to defend himself, can often protect his body, as in the case of Sir Charles Cleveland, who literally kept his assailant at arm's length. The man has not yet been born that could stand up for a moment to a tiger, and the amount of mauling inflicted rests entirely with the animal. Moreover, the tiger's bite is much deeper, and septic conditions not only tend to spread more quickly but are more difficult to deal with. Certain it is that more people recover from leopards' than from tigers' bites, and in my opinion, the latter is considerably the more dangerous animal of the two.

One more call of the leopard—the commonest of all—has still to be mentioned. This is the sawing noise they make and which much resembles a piece of wood being sawn across with short, sharp double strokes, i.e., a thrust and a return. The leopard in making this keeps his mouth partly open and expels and inhales air back and fore across the soft palate. It is very commonly made by a leopard prowling round the camp, and is seldom heard in the forest. It is analogous to the grunting of a lion which I have also generally heard uttered round the camp fire. When

in Africa I was assured that a grunting lion was on the hunt and dangerous, and this is very probably so. Nevertheless, I believe the motive in making the noise is the same in both animals. That it has been interpreted as a sign that the lion is dangerous, whereas no attack by a leopard need be feared, is simply due to the superior courage and strength of the former animal.

In both cases, the animals are somewhat nervous of approaching the camp, and yet desire to inspect it more closely, and they make the noise partly to intimidate, but very largely also to give themselves the necessary courage to approach. For what other purpose is the roar given when an animal charges? This sawing or grunting is merely a modified form of the "roar." Some writers have contended that the "sawing" of a leopard induces deer and other animals to utter cries of alarm, and he is thus enabled not only to know what deer are in his vicinity, but can also select and locate his victim. One of the main objections to this theory is that the leopard seldom makes the noise unless he has been disturbed, or unless his domain has been intruded upon by a camp. It is rare to hear the sound in undisturbed country unless the leopard is coming up to his kill, in which case he often has the same motives as those already assigned, and certainly under these conditions has no object in locating game in order to kill again. Another most serious objection to the theory is that if the leopard habitually locates game which answers the call, and is thus enabled to kill it, such game by this time would have either become inarticulate or extinct. The animals which responded would habitually be killed off. This subject has been dealt with at some length as the subject of the leopard "sawing" is one which is often discussed,

In the middle of the last century, a common form of sport was to have leopards trapped, release them on the racecourse, and then hunt them with spears. The famous Col. Nightingale died from a ruptured blood vessel while actually riding in one of these hunts. This method of killing leopards is no longer practised, but a leopard is occasionally started by hog hunters under rideable conditions. The Nagpur hunt has accounted for two in this way, and some have been killed in Berar. When hunted in the open the leopard puts up a poor show and will squat like a rabbit and can be stuck in this position. If hunted by good dogs it can be bayed, and will climb a tree to escape. Given the time and the place of his own choosing, he would readily seize and carry off any one of the pack. Their behaviour when hunted simply illustrates the truism that two animals hardly ever both hunt or attack at the same time; one is the hunter or attacker and the other is on the defensive for the time being.

Most leopards are shot by sitting up over baits. These may either be an animal which has already been killed or a live bait; the latter is generally a goat or a village pi-dog. It adds to one's chances if the bait continues to bleat or whimper, and this it will generally do if it imagines itself to be alone. A good plan, therefore, is to have the beast's head covered while taking one's place in the "machan" and not to uncover it until one is thoroughly settled in. The chances are it will not detect one and continue to bleat lustily.

Patience, and the gift of being able to sit silently and still are the chief attributes required for sitting up successfully, and as the subject has been fully dealt with in the chapter on tiger, it is unnecessary to enter into details here. It is sufficient to add that leopards

will tolerate a lamp to a greater extent than tigers, and given a moonless night it is by no means hopeless to sit up with a lamp suspended over the kill. In these days of electric torches, illumination by lamp is no longer required. When struck by an electric torch an animal will often stand gazing at the light, giving ample time for a shot, and if held in front of the sportsman, he is absolutely invisible. As leopards can be considered vermin, pure and simple, the ethics of how they are killed does not arise. The number of times on which leopards have been known to return to the kill even shortly after being fired at and missed is also worth mentioning, and although a tiger will occasionally do the same, it is a very rare occurrence. In sitting up for leopards, it is usually advisable to be somewhat earlier on the ground, as they are liable to visit their kills earlier than tigers usually do.

In beating for leopards the same principles as those advocated for tiger should be observed. Although when gorged they are more wakeful than tigers, the majority of leopards are accustomed to the proximity of man, and are less liable to shift to any distance when disturbed. Moreover, they will lie up and conceal themselves in, and break back through, very scanty cover of a nature which from the tiger's point of view would be considered open country. For these reasons, therefore, beats for leopards should be short, and the advancing beaters must carefully beat out every scrap of cover no matter how insignificant.

A good many leopards are also met with and shot on chance encounters, and I have several times sprung them from a small bush in the open where they had evidently squatted like a rabbit on being surprised and cut off from the jungle. As is natural, however, in a Province where tigers abound, time and trouble

are chiefly devoted to hunting the more noble animal, and shooting leopards is a subsidiary amusement. In fact, in tying up baits the general rule is to select buffaloes of a size not likely to be killed except by tiger or by the largest of leopards so as to avoid getting an ordinary leopard kill. Sportsmen domiciled in a less favoured Province, therefore, acquire more knowledge of the leopard and his ways than is usually possessed by residents of the Central Provinces.

Nevertheless, leopards are exceedingly numerous in these Provinces, and I have not been able to observe any diminution in their numbers in spite of the Government reward and the large number killed annually by natives and others. Like tigers, leopards appear to be remarkably free from disease, and apart from man, their only enemies seem to be tiger and crocodiles. I have never known a case of their killing or eating each other in a wild state.

In addition to these factors bearing on their struggle for existence, they breed freely, and owing to the variety of their food and the ease with which they can procure it, a considerable number of animals can exist in a circumscribed tract.

Before closing this chapter on the leopard, a word may be added regarding man-eaters. The same causes which tend to produce man-eating tigers act equally on leopards, but in the case of the latter animal difficulties in the way of obtaining food are much less, and man-eating leopards must more often be animals having a definite liking for human flesh. Some leopards, like some tigers, are occasional man-eaters: others are confirmed man-eaters, and when an animal of this nature frequents a particular tract no one is safe, as owing to their knowledge of man's ways, and being habituated to enter villages at night, they will enter a

hut and drag out their victim from his cot. Man-eating tigers will not venture to do this, or at any rate only on very rare occasions. From a man-eating leopard, therefore, the people have no security at all.

The last man-eater I shot had killed his latest victim in this way ; he was the son of a village " Makkadam " and the corpse was devoured all save the skull, hands and feet. It may interest the reader to know that **the** father insisted on including the leopard's body along with these remnants at the burial and attendant ceremonies. Considering their relative numbers, the recent increase in man-eating leopards has not been so marked as in the case of man-eating tigers to which reference has been made in the chapter dealing with tigers. Owing to their knowledge of man, a man-eating leopard is more difficult to kill than a tiger, and sometimes a cunning animal has defied the hunters for months.

This being so, it has always been a matter of some speculation why Government in gazetting special rewards for killing man-eaters, rates the leopard considerably lower than the tiger. Possibly more courage and enterprise are required to hunt the tiger, although the difficulty and danger are no greater. Certain it is that there can be no choice on the part of the victim, or his relatives, between being devoured by the one or the other.

CHAPTER VI

GAUR AND BUFFALO

The gaur, or Indian bison, to use the patronymic by which this animal is usually known amongst sportsmen, is really a misnomer, as it belongs to a group of wild oxen which does not include the true bison. This group, of which the gaur is typical, is confined to India, Burmah and the Malay Peninsula, and consists of two wild species, the other being the tsaine. The more important structural differences distinguishing the group are, the shortness of the tail, the elevated ridge originating at the base of the neck and which extends to the middle of back, and the presence of thirteen pairs of ribs. Both species also have sleek coats and are maneless.

The gayal, or mithan, continues to be shown in text-books as a third species, in spite of Mr. Stuart Baker's excellent note published on the relationship between the gaur and the gayal in the *Bombay Natural History Society's Journal*, Vol. XV, No. 2. In this article he shows that the gayal is merely a modification of the gaur due to domestication, and that no hard and fast line can be drawn between the two animals. Certainly no one was better qualified to come to a correct conclusion on the point, and so far as I know, he has not been authoritatively contradicted, nor have the facts on which he bases his conclusion been disproved.

The typical gaur, with its modifications, is found

throughout the Peninsula of India as far north as the Nerbudda, Assam, Burmah and the Malay Peninsula. It requires extensive unbroken forest, and provided these conditions exist, can accommodate itself to either open or dense jungle. This being so, the only unexplained limitation to its distribution is its absence from most parts of the sub-Himalayan tract extending west from Assam.

Gaur are essentially hill animals; when found in grassy plains these are usually on hill tops, and they do not resort to low-lying grass maidans, so commonly frequented by his kinsman the buffalo. It is possible that in the sub-Himalayan tract the extent of hill forest of the tropical type is not sufficiently extensive.

Blanford states that in Central India its distribution is bounded approximately, but not absolutely, by the Nerbudda River. The State Forests of the Khandwa District lying to the north of this River, until a few years ago contained a small herd which was wiped out by rinderpest, and being isolated will probably never again harbour bison. The admission of village cattle to a restricted area which had been for long closed to grazing was probably the determining factor in their disappearance. It is not known if Blanford, in making his exception, was referring to any other herd. Further up, in the Mandla district, they are permanent residents of the jungles north of the Nerbudda.

In the Central Provinces bison are found permanently in the following districts: Khandwa, The Melghat, Hoshangabad, Betul, Chindwara, Seoni, Chanda, Balaghat, Mandla, Bilaspur and Raipur. It is probable that a herd still exists in Yeotmal, but it is believed that they are now extinct in Damoh.

In appearance the bison is a huge black animal,

which, owing to the bulk of his body and huge shoulders, gives one the impression of having a small gamey looking head. The legs and feet are also small considering the weight they have to carry. Examined closer, the hair is seen to be dark chestnut brown, sometimes a deep purple brown or almost black. The hair about the axils and groins is golden brown, and the legs from above the knees and the hocks to the hoofs are white. From the eyes to the nape of the neck is also white or ashy grey.

The tail is comparatively short and furnished with a small black tassel. The impression of the enormous depth of the body is accentuated by the dorsal ridge, which commences on front of the withers and extends to the middle of the back, where it ends abruptly. Very occasionally, the animal instead of being dark brown, is dormouse-coloured. I have seen several mature cows and one mature bull having this colouration. The hair of the bison is short and close fitting, and in old bulls is often scanty. The colouration on the body is due to the pigmentation of the skin itself and is independent of the hair.

Lydekker states that the "Iris of the eye is in both sexes light blue." This assertion, amongst others by the same author, has been criticized by Major Stockley in Vol. XXVIII, No. 2, of the *Bombay Natural History Society's Journal*. I agree with Major Stockley in stating the iris to be brown. Any blue that exists is confined to the cornea. Having seen a number of dead, and examined many scores of living animals at close quarters, it would be interesting to know on what evidence Lydekker's statement is based.

◀The crest is generally semi-cylindrical in shape, and the forehead is concave, but these characteristics are not always present. The profile shows the animal to be

roman-nosed, or "ram faced," in Stuart Baker's words. This is due to the slope of the nasal bones. One of the commonest mistakes in depicting or mounting the bison is to give him a straight face with a full protruding nose like an English ox.

Both sexes carry horns. To commence with, the horns grow outwards and slightly upwards, straight out of the head, turn up in the second year, and then in the third year commence to curve inwards. At this stage the horns of a bull very much resemble those of a cow, but the former's continue to develop and the similarity soon ceases. Nothing can better Forsyth's description and illustration of the development of the bison's horn given in his *Highlands of Central India*.

The record horn measured round the curve, according to Lydekker, is 46 in. The best heads come from Burmah and Southern India and are not equalled by specimens from Central India, where anything over 30 in. round the curve can be considered a good horn. Bulls use their horns as implements, and old animals wear down one or even both points, losing most of the curve and as much as 12 in. in length. The horns are a pale semi-transparent sea green with black tips. I have seen it stated that the horns are sometimes reddish in colour. I have never heard of a horn of this type in the Central Provinces. Bison are the tallest oxen in the world, and there are various records of their attaining a height of 21 hands in Kachar and Burmah. They never grow to this size in Central India. The largest bull I ever measured stood 6 ft. $\frac{1}{2}$ in., but most animals are 5 in. less than this. The length of the body from nose to root of the tail was 9 ft. 4 in., and of the tail, 2 ft. 10 in. On one occasion I dismembered a rather old back going bull and weighed it piecemeal

on a 500 lb. spring balance. Allowing for a certain loss of weight in the process the weight was adjudged at about 1,900 lb.

The question as to whether bison are furnished with dewlaps or not has often given rise to discussion, contradictory evidence being produced by persons with limited experience. The facts are, that some bison have well-developed dewlaps, and some have only a slight thickening of the skin the size of a five-shilling piece. The majority carry, considering the size of the animal, a small or moderate-sized dewlap.

The habits of bison do not vary much. They prefer vast unbroken stretches of forest and avoid man and all his works as much as possible. During the cold weather they frequent grass maidans on hill tops, and the bamboo and creeper-clad slopes of the hills. As the hot weather advances, shortage of water and food forces them down, and they can then be found at a lower elevation, frequenting grassy glades or the banks of streams. In the rains they wander much, but during other seasons they frequent the same places at the same time year after year. Their food consists chiefly of coarse grasses, but they eat the bark of a variety of trees, one of the commonest being that of young Haldu (*Adina cordifolia*). Some fruits are also eaten, especially those of Phetra (*Randia dumetorum*) and Bel (*Ægle marmelos*). Young bamboo leaves and shoots are also a favourite food.

The breeding season varies considerably in different districts and is not confined to one period, as I have seen newly born calves on May 1 and as late as October 3. The majority of the breeding, however, takes place in the cold weather, i.e., December and January. In these months I have seen bulls standing with their chins resting on cows' rumps, and at this season big

bulls which are solitary during the rest of the year join the herd. The majority of the calves are dropped in August and September. The period of gestation is not known, but according to this, it would be eight to nine months. One or two calves are born at a time; the mother when calving deserts the herd, but rejoins as soon as the young are able to get about. Calves remain attached to their mothers for two years, and these do not breed again until the third year. A herd may consist of any number of animals up to about twenty. Eight to twelve is the usual number. Young herd bulls will be found with the cows at all times, but during the breeding season the master bulls, who lead semi-solitary lives, drive these youngsters away. These master bulls, however, are of no great age. The really old beasts lead solitary lives, and this animal seems to lose all sexual instincts at a comparatively early age.

I once came on two bison fighting in the Chanda district, and whether they had originally charged each other or not, I cannot say, but when I saw them they were shoving each other about, and when disengaged, they swung their heads from side to side with a twisting motion, and in so doing gave each other terrific blows on the horns; in fact it was the clatter of the horns which first aroused my attention and drew me to the spot. They attempt to fend off a dog in the same way.

<Cows hardly ever lead solitary lives, and if a single beast is encountered it is either a bull or a sick cow. Two bulls of about the same age often consort together, and I once shot two old bulls, right and left, leaving a village tank in Chanda. This is the only case in which I have ever known bison to approach the habitations of man. It has been related to me that about twenty

years ago, in the rains, a bull bison strayed into Kamptee Cantonment and was shot. The animal by all accounts was trekking from the North Chanda forests up to the Satpura Hills of the Seoni District.

Bison utter no less than five distinct sounds. The one most commonly heard is the cry of alarm. When disturbed, they throw up their heads and repeat a noise which can be spelled as "pff-hong." The "pff" is the noise made by the rush of air past the lips before the note is struck. Mothers low to their calves, and bulls bellow in rage. In addition, they make a sort of "bhay" noise, which so far as I have been able to discover is also a cry of alarm, but it is difficult to understand how an animal could require two calls of this nature. This call may be more in the nature of a note of interrogation, and a reply in the same terms may be expected, whereas the noise described as "pff-hong" is more definite and raises every head in the herd. There remains to describe yet one more sound—the most peculiar of all. Bulls when breeding, and in the herd for that purpose, utter the most absurd piping or whistling sound, more like the call of a bird than anything else, and absurd by reason of it emanating from so large and powerful an animal. This sound is not often heard. The late Mr. McCrie, Conservator of Forests, heard it in the Mandla District in 1903 and first drew my attention to it, and since then, with patience, I have succeeded in hearing it twice myself.

Bison have few enemies to fear. Tiger and man exhaust the list. Their avoidance of man, and the regular trek they will make in some places if disturbed, seem to be instinctive and difficult to explain. A legacy from past conditions does not meet the case, and many animals which have much greater reason to

fear and avoid man are far more tolerant of his presence than the bison. Tiger will not only kill calves, but will also attack full-grown animals, even solitary bulls, but in this case there are usually two tigers together. No tiger could break a bull bison's neck; the bull is therefore first disabled by biting through his hock and hamstringing him. I have come on several cases of this nature. A large heavy animal like a bison is helpless when reduced to three legs. I came on one case in which, although wounded, the bull had succeeded in saving his hock and the tigers had given up the attempt. Sanderson and several writers have referred to the association of bison and elephants. A runaway elephant lived for years in the Betul forests and regularly consorted with a herd of bison. Excepting elephants, however, bison keep very much to themselves and have no relations with other animals except the tiger. They are essentially bucolic, their desires are encompassed in the words "Peace and plenty."

Bison, when moving about in the jungle, are noisy and can be heard crashing and breaking through bamboos and jungle. As is usual in the case of noisy animals, their hearing is poor.

Living as they do, mostly in dense forest, and requiring little means of protection beyond their bulk and strength, their eyesight is poor, incredibly so. Out of many instances a few examples may be given. I have several times walked into a glade in full view of a herd of bison not more than 30 yards off before I was aware of their presence. A few cows have raised their heads and after staring intently at my stationary figure for some time, quietly continued to graze. Again and again, even after the alarm has been sounded, and although well exposed, by keeping motionless, bison have failed to pick me out from my surroundings.

On one occasion I had shot a bull in the middle of a grass maidan. The herd bolted a short distance and then returned to their fallen lord. The herd, excited and angered at the smell of the blood, commenced to bellow and paw up the earth. There was no tree nor any sort of refuge. To be charged by a whole herd with only a mauser rifle in my hand, was about the last thing I wanted on this earth. I therefore shouted loudly to try and scare them, but with no effect. My shikari, thinking I wanted him, answered from the hill-side. This the bison recognized as a human voice and promptly bolted. Up to that time neither the noise I had made, nor what they had been able to see of me, had conveyed to them that I was a man. It is due to their lack of perception that they have earned an unmerited reputation of being addicted to charging. I shall refer to this subject at some length later on.

< The only sense at all developed in bison is that of smell, and in their powers of scent they excel. I have known a solitary bull wind me at nearly 400 yards in an open grass maidan. We neither of us could see or hear each other, when he suddenly jumped up and bolted—the wind was blowing straight from me to him. I have had many other instances of their perception of smell. >

When I first went to the Central Provinces, the old habit of shooting cows as well as bulls had only recently gone out of fashion, and the regulations regarding shooting were considerably stiffened. Amongst other game, bison were more strictly preserved, and, as they are seldom poached by natives, the protection was effective, with the result that they increased rapidly in numbers, and the Province now contains more bison than it did twenty years ago. Nature however sets a

very strict limit on the number of animals of this size a particular jungle will maintain, and when overstocking takes place some disease contracted from tame cattle sweeps through the forest and almost exterminates the bison. They are particularly liable to fatal attacks from rinderpest and foot-and-mouth disease, and sometimes a splendid stock of animals is killed in one season and takes many years to get up again. It would often have been better to have maintained a smaller stock by allowing more animals to be shot.

The recognized method of shooting bison is to stalk them. One of the first difficulties the novice encounters is to distinguish bulls from cows. As already stated, a solitary animal is nearly always a bull. So also is an animal with the point of its horn worn down. Cows hardly ever carry a worn horn. To try and pick out the bull in a herd by his bulk often leads to a cow being shot, as an animal standing on some slight eminence unobserved by the sportsman, appears to be the largest animal. Some writers recommend one to look out for the scrotum, and in doing so, draw upon their imagination, as this, as well as the testes, taking the size of the animal into consideration, are extraordinarily small and quite indistinguishable at any distance. A little reflection will convince one that no animal if hung like a domestic bull could survive in the sort of country a bison lives in. The best plan is to look at the horns, especially the set and angle at which they are placed. Cows' horns stand more upright, whereas bulls' tend to press downwards on to the ear, besides being larger and longer. It will save the sportsman many a weary tramp if he will first of all send out scouts to find out the particular locality where the bison are—the places to look for them at different seasons have already been

indicated. Another plan is to send out scouts in couples, one of whom keeps in touch with the bison while the other returns to camp.

The sportsman should always approach up wind, and provided he can be sure of not giving his scent, need be in no hurry over identifying the bull and waiting for a good target. Behind the shoulder, or at the junction of the neck with the body, just in front of the shoulder, are good spots to fire at. In firing behind the shoulder, it is well to remember that owing to the dorsal ridge the vitals are relatively low down. Frontal shots and head shots should be avoided if possible, and only heavy rifles with solid bullets should be used. The larger the animal, the more accurately one must shoot in order to kill, and not merely wound. This axiom is often forgotten, and it is only the experienced shikari, who is sufficiently steady on coming up to bison to be sure of planting his bullet exactly where he intends, that has earned his right to use a small bore if he so chooses.

△ In following up wounded bison, it is necessary to remember that he is just sufficiently dangerous to make it necessary to observe a few simple precautions. The tales of the ferocity of bison which give the animal a bad reputation, and which are a common feature of some books on shikar, are now largely discounted. Rare and isolated instances of an addiction to charge, the peculiarity of a particular individual, cannot be adduced as evidence against the normal animal. They certainly seem to be apt to charge in Mysore and Burmah, and although they will very occasionally charge in the Central Provinces, they very seldom do so, and hardly ever under circumstances which need endanger the hunter. Their more truculent behaviour outside the Central Provinces need not imply much

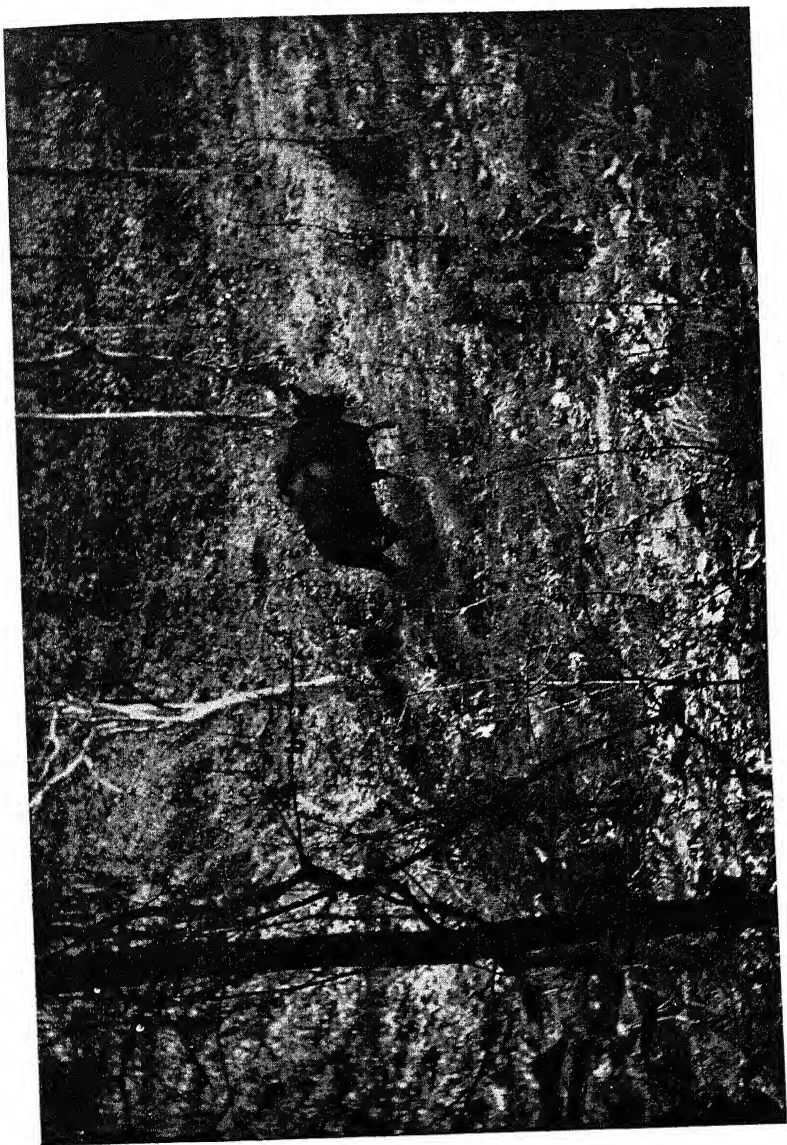
difference in character, but might be due to the denser cover>

One of the most fruitful reasons for the false reputation the bison has earned is his own behaviour, combined with the ignorance of the shikari. The animal whips round, utters a cry of alarm and continues to stand gazing, trying to make out the hunter. The latter, thinking he must be clearly visible, imagines a charge is contemplated, and, recalling the maxim that

"Thrice is he armed who hath his quarrel just,
But four times he who gets his blow in fust,"

promptly fires into the bison's chest. Now, it is an exceedingly difficult thing to knock a bison out with a shot at this angle. Any one who has examined a dead bison will easily see why, and it is only the very heaviest rifles and the hardest of bullets that could hope to reach the vitals.

The tendency of animals when struck at stance is to bound forward instantly in the direction in which their body is pointing at the time. This is their first impulse; reflection and reasoned efforts to escape develop later. The bison, therefore, on being fired at, blunders wildly forward, and the young hunter returns with another tale of a charging bison, when as a matter of fact no such intention ever entered its mind. On one occasion, some out of a scattered herd of bison winded me in a grass maidan and there was a general stampede. I was standing just on the point of a spit of Sal forest. One cow and a calf came galloping straight at me. I had sufficient time to realize that the beast was not really charging, but making for the nearest jungle, and by jumping on to a rock I succeeded in showing myself, when she swerved right away.



BULL BISON.



Once when marching along a jungle road in the Melghat, in a narrow and precipitous defile, my two terriers lagged behind and started a bull bison. It came thundering through a whole party of us, but made no attempt to charge anyone. As the dogs seemed inclined to stick to the bull, and it was difficult to get out of the ravine, the opportunity of taking a photo of the bison seemed too good to be lost, so I set off after it, camera in hand. I was accompanied by a forest guard carrying the rifle, and the idea was that if the bison cut up rusty there was to be a rapid exchange of implements. It was only after the greatest provocation that the bison did at last turn round. Alas for previous arrangements. The forest guard bolted to a tree with the rifle, the bull after him. He had no time to climb, and the bull's head crashed into the stem of the tree. He then hunted the guard round the stem, but the guard could circle it quicker than the bull could. The latter then retreated and charged the tree three times, bending it right over, and I thought the guard, who was still behind the stem, would be crushed. However, the bull desisted. After this performance I reconstructed my ideas as to the size of a "bison proof" tree. We continued the hunt, the bison making no further attempt on us, and I got three exposures at 15 yards as he went past me. This story is told to belie the false reputation the bison has got. No animal that was really dangerous could be followed in this way, and the reader may be assured that I should not have made this attempt if I had thought there was any serious risk in doing so.

At one time my work took me pretty constantly to a spot where bison were very numerous. There was a large herd, and seven or eight old solitary bulls as well.

Our regular evening amusement was to go out and watch the bison. On no occasion did they ever show any resentment, not even when irritated by a catapult. In following wounded bison a terrier is invaluable. <Bison have no speed and are easily puffed. They will both trot and gallop, but only for a short distance; the pace soon slows down to a rapid walk, which they can keep up interminably and over the most dreadful ground, going up the sides of the steepest hills in a way that taxes the endurance of the hunter even if he is in the best of training.>

Another way of getting bison is to track them just at the commencement of the rains. When the ground has been softened the spoor can be followed for miles at a rapid pace. The procedure is to go out in the morning, pick up a fresh trail and follow it. As one never can tell what sort of a dance the bison will lead one, the sportsman is advised always to take food and drink with him, and to start off with the idea of not returning to camp until evening. There is a certain fascination in this method of hunting. There is first of all the certainty, that sooner or later one will come up with the game, and as the condition of the broken grass or fresh dung, and other signs on the trail begin to show that the animal is close at hand, the excitement, which has never been absent, increases. In addition to this, the doings of this interesting animal during the night can be easily read. Bison give off a strong, sweet smell similar to that of English cattle, and it is possible to wind a herd at quite a distance and even detect the proximity of a single animal; this is often of great assistance to the hunter.

<Bison are given to circling round and crossing their trail, especially when selecting a spot to lie up in. When nearing the quarry, therefore, it is necessary

to go very slow and look carefully on all sides and not merely ahead, otherwise the whole stalk may be spoiled. Stalks are often spoiled by the wind, and if a choice of trails is offered, take the one leading up wind. Bison generally lie up about nine o'clock, but often rise again about four. They also lie down during the night. They cannot be considered nocturnal animals in thick cover, but are so as regards open plains, and they only emerge from the forest into open country shortly before dusk, and never remain in such places long after the sun is up.

Recommendations are sometimes made in books on shikar to hunt bison by driving. In my opinion this should be a last resource, as it nearly always fails. In the true sense of the word bison cannot be driven; they can be moved, and if the gun happens to be on the line of retreat they have chosen he will get a shot, but not otherwise. They cannot be induced to take a line out of their own choosing, or forced up to a line of guns of which they have become aware. I have known many bison come out in chance beats, and I have even seen a tiger and a bull bison come out together in a tiger beat, but when other means of hunting bison are possible, it is usually better not to disturb the ground by beating.

On one occasion I was walking in the beat trying to bring up a large herd of bison to a line of guns. All went splendidly to start with, and we could see the bison heading straight for the guns. When about two hundred yards off they pulled up, and after very little hesitation turned round and simply walked through us as if the beat did not exist. Of course they had winded the guns. There is little more to be said about this magnificent ox and we will now bid him adieu.

BUFFALO

My experience of wild buffalo does not entitle me to write with any authority on their ways and character as I have only seen them on three different occasions. Nevertheless, in a work of this nature, one is reluctant to make no mention of one of the largest animals found in the Provinces, and incidentally the largest horned species of the genus *Bos* found in the world. The remarks which follow are chiefly based on what I have been told by others, more fortunately placed than myself and who had opportunities of studying the animal, which have been denied to me.

According to the text-books, this animal's geographical distribution extends from the east of Assam where it is found in the plains of the Brahmaputra and the Ganges, and thence into the Eastern portion of the Terai; the coastal plains of Midnapore and Orissa, and the Northern portion of Ceylon. Buffalo, in a wild state, are also found in parts of Burmah and the Malay Peninsula, but whether these are tame animals run wild or not, has yet to be determined: nor will the matter be easy, as probably no animal subject to continuous domestication has undergone so little change, and the interbreeding of tame cows with wild bulls is still a commonplace event in many parts of India. The conditions which they prefer are large grass plains, with a plentiful water supply, and they insist on these being more or less fulfilled. This is the key to their distribution: they are essentially a plains-loving animal and will not be found regularly inhabiting hills.

The great mass of the Central Provinces does not suit their requirements. The distribution in these Provinces is confined to the south-eastern portion. Their western limit is the Feudatory states immediately to

the east and north-east of the Balaghat district, where they occur in fair numbers. Animals from these herds at times trek into the State Forests of the Balaghat District, and even as far north as the Banjar Valley in the Mandla District. To what extent these herds stray eastward and into the Drug and Bandara Districts I do not know, but it is probable that they occasionally do this.

Buffalo are next found in the North Raipur Division and thence southward and eastward through the Bastar State. Herds are also found in South Chanda, and at the beginning of the present century in parts of North Chanda as well, but I understand they are no longer found in this tract.

In 1904 there were two small herds of cows and a few solitary bulls in the Allapilli and Ghot Ranges of the South Chanda Division. In the south-eastern portion of Allapilli and in the Aheri estate they were somewhat more common. It is unlikely that these herds have increased since 1904, and it is necessary to emphasize the fact that but for the possibility of recruiting from the neighbouring state of Bastar their disappearance from British territory in this tract is probable.

The innumerable herds mentioned by Forsyth as frequenting the Zemindaris in the north of Bilaspur were a mere tradition when I explored this very wild tract of country, and so far as I was able to ascertain not one single animal remained. I was informed that they had all been killed by poisoned arrows which the aborigines there still use, and that the object of the slaughter was to gain a few rupees for the skins when trade in this commodity first reached these parts.

Like the elephant, it is probable that the buffalo in past days had a much wider distribution and extended into the trap areas. This is indicated by the names

of places inside jungle tracts and prehistoric drawi in caves.

It is also known from actual records, and in some places such as Yeotmal and parts of Mandla buffalo have disappeared during the present generation. Inhabiting the country as they do, they are constantly liable to infection from village cattle, and although this would tend to create a certain amount of immunity it has proved insufficient. Bison, on the other hand, owing to their habits often escape infection, but are less immune and show less resistance to disease than buffalo.

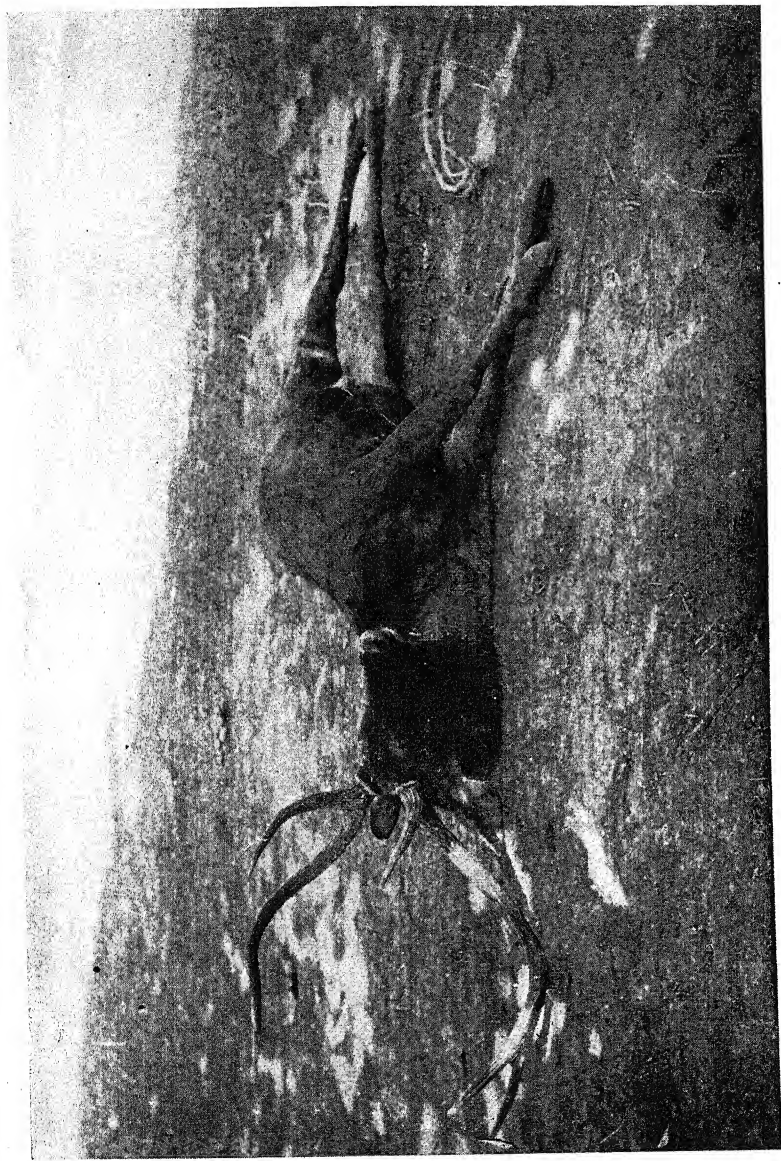
< In appearance, the buffalo is a large black or slaty black animal, much resembling the tame buffalo of the country in which he lives, but the wild animal stands a hand and a half to two hands higher, and freedom has endowed him with a nobility of carriage not possessed by the tame animal. The hair is scanty, especially in old animals, and the pigmentation of the skin determines the colour. The direction of the hair is peculiar and points forwards over the forequarters and neck.

The horns are black and triangular in section, but vary in type. One type grows upwards from the skull in a regular semicircle; in the other the horns grow straight out from the side of the skull laterally and only curve towards the end. > Both types are found in the Central Provinces but the former predominates. Lydekker gives the largest known horn as being one of $77\frac{3}{8}$ in. in length. Horns do not develop to this size in the Central Provinces. On the other hand, I have seen horns of great girth equalling anything produced in India. Lydekker gives the maximum recorded measurement as being 6 ft. $2\frac{1}{2}$ in. at the shoulder. This is a good deal higher than anything I have come across. A bull I measured was 64 in. at

SAMBAR STAG.



A PARANINHA, SPAIN, ON THE



SAMBAR STAG.

11 HARASINGHA GOTA OF THE

the shoulder. From the nose to the root of the tail was 106 in. Colonel Burton, in Vol. XXIV, No. 1, of the *Bombay Natural History Society's Journal*, has given measurements of two bulls from the Godavari District which approximate these figures but are somewhat larger. He also publishes the weight of one animal as being 2,001 lb. and estimates the other to have been 240 lb. heavier. This, I believe, is the first occasion on which an actual weight, as apart from an estimate of the same, has been published. The results confirm what I have always held, namely, that the wild buffalo, although shorter in height, is a bigger boned and heavier animal than the bison of the Central Provinces.

Wild buffaloes live almost entirely on grass and will be found grazing about in the early morning or late evening, often in herds of from eight to fifteen animals. Like bison, old bulls lead solitary or semi-solitary lives. During the day, they lie up in thickets or heavy grass patches. They are much addicted to mud wallows and love to immerse themselves in water up to their necks. They will be found in pools both during the hot weather and the rains. In the latter season they will lie almost all day in water, constantly immersing their heads to free themselves, if even for a moment, from the torment of flies.

They are stated to rut in the autumn, and one or two calves are born ten months later, but I have never had the fortune to observe them during these periods. Wild bulls not infrequently mate with tame cows, and at the request of some villagers I once shot a wild bull which had denied access to the tame cows for some days previous to my arrival. I was led into a bare rice field close to the village, and when 40 yards off, the wild bull removed his chin from a cow's rump and by a snort and a shake of his head clearly indicated that

sidered my intrusion had gone far enough. A solid '577 bullet behind the shoulder threw up a cloud of dust from off his skin, and the bull galloped 30 yards forward across my front, pulled up, and snorted loudly. A second bullet followed the first into the same place with no apparent result, when changing to a 12-bore rifle firing 6 drachms of black powder I fired at the neck and dropped him dead. These facts will give the reader some indication of the strength and vitality of the wild buffalo. Nothing but solid bullets and the most powerful weapons should be used, and frontal shots avoided: behind the shoulder or the triangle are good spots to fire at. The triangle is a well-defined depression between the last rib and the point of the hip bone. A bullet placed there breaks up the kidneys, damages the spine and has a very paralysing effect.

The usual way of shooting buffalo is to quest either on foot or on an elephant in grass maidans or along the bank of a stream, and having sighted, to stalk in and shoot them. They can also be tracked in much the same way as bison are hunted. The same difficulty also arises in distinguishing bulls from cows. The horn of the latter is often longer, and the longest known horn is a cow's. Cows' horns, however, are much less massive and the bull can be recognized at once when seen: mistakes usually occur by taking a cow for a bull before the latter has been sighted. The sportsman is warned that if he is in any doubt on the subject it is ten to one it is a cow. < Buffalo are much less nocturnal than bison and more tolerant of the sun, living as they do in more open country and can be stalked and killed with more certainty.

They possess poor powers of hearing but have
 sharp sight and excellent noses. Unlike

the bison, even when unwounded, they are dangerous, and when followed up after being wounded are exceptionally so, and will charge in the most determined manner, and although easy to hit are exceedingly difficult to stop. They will even charge an elephant. They are liable to contract diseases from village animals and are killed by natives to protect their crops to which wild buffalo, unlike the bison, will freely resort.

Their only enemies are man and tiger. Except with immature or sick and wounded animals, the tiger stands little chance and would seldom attempt to molest them. Col. Barclay informs me he once abandoned the search for a sorely stricken bull at dusk, and found it had been finished off in the night by a tiger, and even in this condition the tiger had attacked its hind legs and hamstrung it before he was able to deal with it.

The courage of even tame buffaloes is often shown when a herd is driven on to a wounded tiger. Although their behaviour is by no means consistent, on winding the tiger they will often club together and running up on the scent, charge. On occasions they get so excited they will charge anything except their own particular herdsman, and the scent of a European seems to irritate them: in the wilder parts of the country they are even sometimes aggressive without the stimulation of a tiger's scent. A cow once made an unprovoked attack and overthrew my pony and of course myself with it.

In laying on a herd of buffalo to a tiger stirring scenes are sometimes witnessed. I have seen the cows on scenting the tiger and grunting in rage, open out so as to let the bull through, who, accepting his responsibilities, led the charge followed by the cows. The magnificent bull and the tiger

pressed to the ground and held there, was instantly impaled by a number of the cows' horns and torn to bits. On another occasion I saw a tiger try to avoid the descending avalanche, and leaping wildly into the air he alighted on a cow's back, seizing her firmly in his teeth and claws. The cow sank to earth and the rest passed on in a furious rush, but realizing they had overrun the tiger, and hearing the moans of the stricken cow, they pulled up and returned. How they would have dealt with the tiger, I cannot say, as I had meanwhile shot it, and the wounded cow rejoined the herd. These events are related to show that if the tame animal possesses this courage and thus co-operates for mutual self-defence, it is unlikely wild animals suffer many casualties from tiger.

The number of buffalo in the Province has decreased greatly, and although the process has been retarded it still continues. Owing to their liability to disease and the comparatively limited area suitable for their requirements, no animal requires stricter protection from Government, and the very strict limits placed on shooting them are amply justified.

ELEPHANTS

Historical records and the names of places such as "Hathi-Doh" or Elephant Pool indicate that in past times elephants were found in many parts of the Central Provinces, but this is no longer so. In fact, at the present day it can hardly be considered as an animal belonging to these Provinces: so much so that any detailed account of its habits and ways in this work would be out of place. A few wild elephants still exist in the Zemindaris in the north-eastern portion of the Bilaspur District. This is the only place in which

I have seen wild elephants in the Central Provinces, and I believe it is correct to say that it is the only place in which they still exist. In the rains these elephants occasionally trek west as far as the Mandla District. Eastward of these Zemindaris in the Province of Behar and Orissa several fine herds of elephants are to be met with locally. These are the only elephants which now inhabit what may be termed the Central portion of the Peninsula of India.

NOTE ON THE BISON'S EYE (Page 147)

A detailed description by the author of the colouration of the bison's eye has been published in the Bombay Natural History Society's Journal, Vol. XXXI, No. 1. It is there shown that the great mass of the eye is dark brown and that the blue light emanating from the cornea is derived from a bright blue pigmentation situated at the back of the eye in the region of the optic nerve. This reflected blue light is only visible at certain angles: thus the varying opinions expressed regarding the colour of the bison's eye can be explained.

CHAPTER VII

THE SAMBAR

The sambar, as well as being the largest, is also the most widely distributed deer found in India. Essentially a forest-loving animal, wherever sufficient cover exists, he is found from Ceylon in the South throughout the Peninsula and northward penetrating the outer fringe of the Himalayas: moreover, a variety of the same animal extends from Assam eastward through Burmah and even down into the Malay Peninsula.

The appearance of the animal can vary considerably in different individuals, and in the same individual at different seasons of the year. Generally speaking, this deer is a uniformly large dark-brown animal, with a yellowish tinge under the chin, inside the limbs, between the buttocks, and underneath the tail. Females and young animals are lighter in colour. Old males are often almost black, and this impression is often accentuated by their addiction to mud wallows. A piebald stag was shot in the Melghat in 1916, the skin having large white patches. This is the only case of the kind I have ever heard of.

The young are never spotted but are often furnished with a dark dorsal line. Animals of a dark slaty grey are commonly seen, and this colour as well as a much lighter shade of brown is regularly assumed in the hot weather. The hair is coarse, especially so on the neck, which is maned in both sexes. The ears are large and

obovate in shape, and when seen but dimly through a screen of grass or jungle much resemble the frosted terminal leaves of a young teak tree, amongst which the animal is often found. The infraorbital glands are very large, can be everted, and during the rut give off a strong smelling secretion.

In parts of India, especially towards Assam, sambar have often been observed to have a curious sore bare patch or spot on the base of the neck. The cause is not known: it has been suggested that it is the manifestation of some disease. The phenomenon is not common in the Central Provinces, and I have only noticed it late in the hot weather or at the commencement of the rains. At this season of course sambar are subject to little intelligent observation, and it is possible that these spots exist more frequently than we are aware of. Occurring as they do in the region of a hair whorl or centre, and at a time when a rapid moult is taking place, I have associated the phenomenon as being in some way connected with the new growth of hair. When sambar change their coats they often do so in large tufts, the old hair coming away in sections before the new hair has developed. During this stage they have a very ragged appearance.

The normal form of horn consists of two fairly long powerful brow tines coming off at an acute angle from the beams. These in turn grow outwards, and curving slightly backwards divide about the 28th inch and give off two approximately equal branches of 7 or 8 in. in length. A common variation of this type is for the outside tine to be longer than the inside one and to assume proportions entitling it to be considered a continuation of the beam. Again, this process may be reversed and the inside horn is the longer of the two.

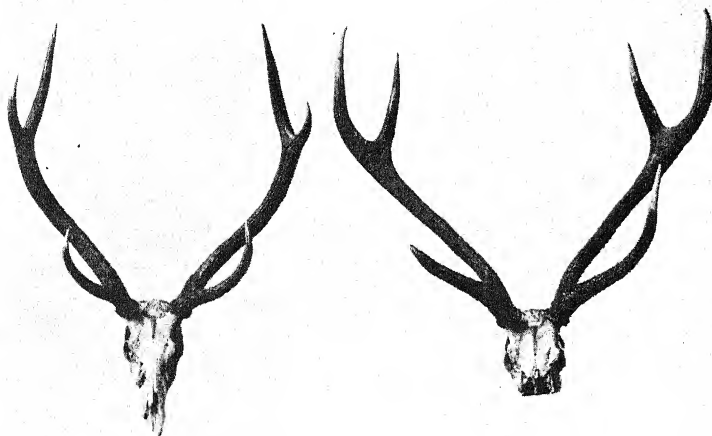
I. TWO SAMBAR HEADS SHOWING THE VARIATION IN THE LENGTHS OF THE TOP TINES.

	Lengths.		Points.	Girth.	Spread.		Weight.
	Beam.	Brow tine.			Tip to tip.	Widest inside.	
	in.	in.		in.	in.	in.	lb.
A { Left . .	37	15½	3	6½	31½	31½	15½
Right . .	38	14¾	3	6½			
B { Left . .	41	22½	3	6	38½	38½	18½
Right . .	42	broken	3	6			

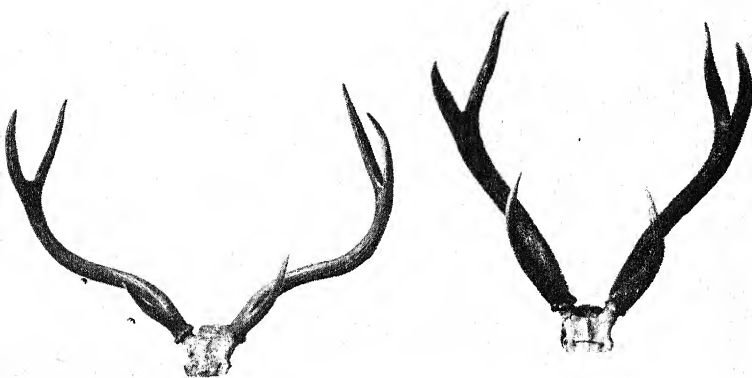
II. TWO SAMBAR HEADS WITH THE TWO TOP TINES APPROXIMATELY EQUAL BUT SHOWING OTHER VARIATIONS IN TYPE.

	Lengths.		Points.	Girth.	Spread.		Weight.	Remarks.
	Beam.	Brow tine.			Tip to tip.	Widest inside.		
	in.	in.		in.	in.	in.	lb.	
A { Left . .	42	14½	3	6½	40½	42	16	An exception-ally wide curved head.
Right . .	41	10	3	6½				
B { Left . .	40	18½	3	7¾	33½	33½	21	An exception-ally massive straight head.
Right . .	40	20	3	7¾				

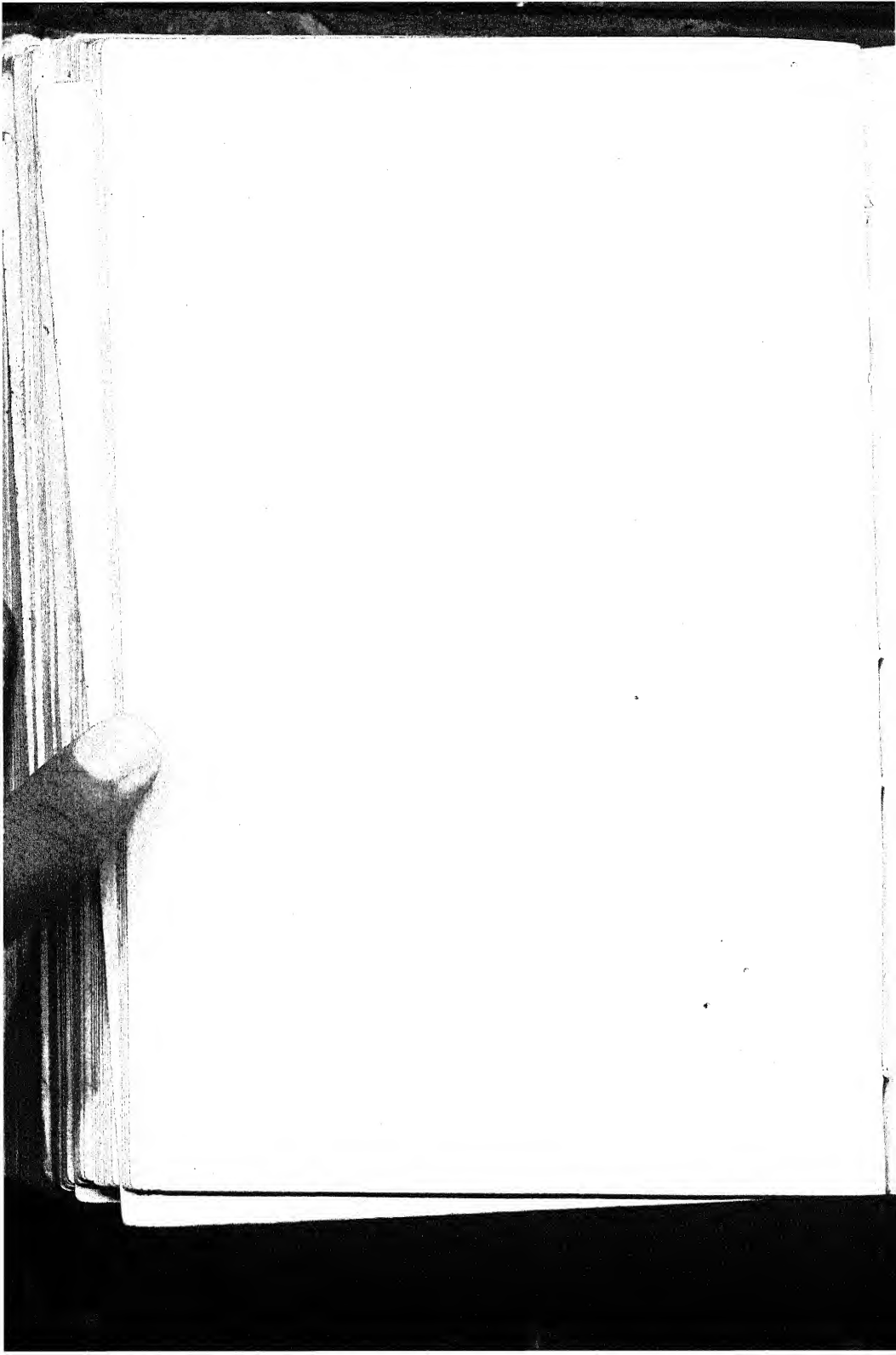
I.



II.



SAMBAR HEADS.



Out of thirty-four large heads in my possession, sixteen have approximately equal tines. Nine have the beam prolonged outside, and nine inside. The latter formation is apt to detract greatly from the beauty. Sometimes the horns grow straight out in a wide v-shape. Abnormal heads are common, one of the commonest being a switch. In such cases one or more axillary shoots are sometimes developed. Another form of abnormality is for each point including the brow tine to bifurcate, thus converting a six pointer into a twelve pointer. I have come across two animals bearing heads of this nature, one in Chanda and one in the Dulghat Reserve of the Melghat. The latter animal reproduced the same type of horn in two successive years.

As Divisional Forest Officer of the Melghat, I took the collection of dropped horns out of a contractor's hands, partly to increase revenue and partly to try and control poaching; allowing for a fair number of skulls with horns attached as the result of jungle casualties, any increase over this number could be ascribed to the poacher, and a man who habitually brought in horns which had not been dropped had to explain himself. In two years approximately four tons of dropped horns were collected. The detailed examination of these all at the same time was a unique opportunity for the study of the variations in type of this animal's horns. Sambars' horns are often smooth, especially in young animals, but stags at their prime generally carry very rough corrugated horns which add greatly to their beauty. The full number of points is developed in the fourth year. The age to which sambar live is not known, but it is believed they attain a great age, and it is certain that

it is many years after the six points develop before full maturity is reached, and they continue in this stage for a long time.

I had the fortune to shoot the master stag of a large and favourite valley in the Mandla District. The horns were of a peculiar and unmistakable type, coming almost straight out in the shape of a very wide \vee from the skull, and with practically no curve in them at all. It was some time before I succeeded in bagging him, and during my rambles I saw no other stag except of this type, and I came across many of all ages and sizes. This shows that a stag of a particular type transmits his characteristics to his offspring, but in addition, as many of these were large mature animals of warrantable size it is evident that this master stag had been in possession of this valley for a very long time. It is of course possible that these large stags of the second rank may have owed their origin to the parent of the master stag, but the latter's rugged appearance and obviously much greater age made it unlikely that I mistook his brothers for his children.

The record horn is the well-known Bhopal animal of $50\frac{1}{8}$ in. in length. This was killed in territory adjoining the Central Provinces. Kandesh in the Bombay Presidency has produced some very fine heads, but the great bulk of the finest sambar come from the Central Provinces. I have been informed that Mr. Cumine, late Commissioner in Sind, possessed a dropped horn which measured 52 in., which he found in a Parsi's hut in Khandesh. In addition to its length this horn was exceptionally massive. Large heads may be met with anywhere, but particularly fine sambar districts are the Melghat, Mandla, Chanda, Balaghat, Betul and Saugar. Anything from 40 in.

upwards is considered good, but perhaps for no other head is the mere tape measurement so poor an indication of the trophy, as girth or weight are factors of equal importance, and it is common to see a long spindly horn which cannot be compared with a large massive one perhaps only a few inches shorter. In appraising trophies from this animal therefore, the German system of taking the weight into account should be adopted.

The following are measurements of an average sambar stag :

Height at shoulder	55 in.
Length	6 ft. 9 in.
Length of tail	12 in.

A number of weights recorded average out at 610 lb., but this excludes an immense and a quite exceptional animal which weighed 707 lb. The weight of the "gralloch" is 110 lb.

This large animal measured 59 in. at the shoulder. Lydekker states that sambar attain "a height of at least 64 in.," i.e., 16 hands. It seems to be a question of stating in what locality they ever do reach these dimensions, certainly not in the Central Provinces, where, moreover, the most perfect specimens of this animal are found. Size of body and horn do not necessarily go together. Outside the Central Provinces my experience of sambar is limited to the Terai of the eastern part of the United Provinces. Here the horns were comparatively poor, but the body certainly did not exceed those of the Central Provinces.

Most sambar shed their horns in the end of March and the beginning of April, and the new horns begin to grow towards the end of May. On one occasion

I saw a stag in velvet on May 1 accompanied by a stag in horn. I shot the latter and on turning the beast over the horns snapped off like carrots in my hand. This recalls the oft-repeated story to the effect that they do not shed their horns annually. So far as my experience goes, I have never known a case which even remotely suggested that this was so, and it has always been a matter of surprise to me that the story has obtained such a wide circulation and been so constantly repeated.

I am of course only dealing with the animals found in the Central Provinces. Anyone who has observed the marked seasonal change which takes place in the sambar's appearance in the hot weather, the complete casting of his coat, and the general impression of shrinkage which he conveys, must demand the very strongest evidence in order to believe that the horn persists. No such evidence exists; in fact it is all to the contrary effect, and animals even in captivity shed their horns regularly. In making this statement, I discount a "belief" expressed by some sportsmen as not amounting to "evidence." What is required is a record of some stag shot in August or September in "full" horn. I have found no such record in any book of sport or in any note or correspondence on the subject, and I have never met anyone who has seen a sambar in full horn during these months.

On one occasion I broke a large stag's thigh in December when his horns were barely clean. He escaped me in long grass. I killed the same stag in the end of the following May. Owing to his having been wounded, he had not even finished cleaning his horn, and it seemed to me as if the process which results

in the horn dropping had been arrested, and as if the horn might have persisted for some time. Exceptional circumstances of this nature however cannot be adduced as evidence in support of normal conditions.

By the time the rains have set in, all the stags are in velvet, and the horns continue to grow throughout the rains. During this period, the points of the horns are tender and pulpy, and as the animal lives in thick forest he avoids the possibility of being forced to rush through the cover, whereby he would not only hurt himself but damage his horns as well. To achieve this purpose therefore, the stags retreat during this period to the small open grass plots so often found on the hill tops, and lead the most secluded lives, moving only to short distances in quest of food. Their beds will constantly be found in these places after the rains, but sportsmen will often search in vain for the animals themselves in such localities at that time. I was in camp during the rains of 1900 up to September 19, engaged on famine duty and living in gond huts in one of the wildest parts of Mandla. On ascending a hill I constantly used to jump stags in velvet in localities such as I have described, and it was clear that they stayed there until the horn had grown. Growth ceases about the end of September, and the stags commence to clean their horns.

The preliminary cleaning takes place on the top of the hill, but they soon descend and a favourite rub is often situated on a spur between the junction of two small watercourses. Whether such spots are purposely selected or not I cannot say, but one cannot avoid being struck with the fact that they often overlook the surrounding ground and eliminate the possibility of a surprise attack—a very real danger to an

animal engrossed in cleaning his horn. Stags will return to the same tree night after night, any tree with smooth bark will be used; one of the most favoured is the Salai (*Boswellia serrata*). The bulk of the horns are clean by the middle of November, but this as well as the rut varies in different districts by as much as three weeks. Most of the breeding, however, takes place in the first week in December, and the period is of short duration. Previous to this, the stags bellow in challenge and fight each other for territory and the possession of some favoured valley, accompanied with the sole right to issue a challenge therein. A small level grass plot in the forest serves as an arena and one constantly comes across these places, where the evidences of the struggle are clearly marked.

Most of the fighting takes place at night, but I have had the fortune to witness the combat more than once. The two stags, although in full view and well aware of each other's presence, approach each other stealthily, having been brought together by repeated challenges. At this stage their heads are stretched out, and with their tails cocked up in the air and with all the hair along their back and their mane bristling, they present a most formidable appearance. I may here add that on other occasions, if angry or annoyed, stags and even hinds will assume this attitude. When close together the stags lower their head and close in: it then becomes a shoving match in which the heavier animal has the advantage. This advantage can be successfully countered by experience, and the determination of an old stag to retain his pride of place. As their fighting grounds are nearly always on level places, one wonders if combat is declined except in spots where there can

be no unfair advantage. Hinds have also been seen to fight, but their methods are different. They stand up on their hind legs and give each other the most fearful blows on the skull with the fore feet. The noise they make resounds through the jungle. This method of defence is also employed against dogs. A herd of five hinds once rounded on a pack of large useful dogs of mine, and knocking the dogs over right and left drove them right up to my feet, taking all further desire to molest sambar hinds out of their composition for the time being.

The late Mr. McCrie, Conservator of Forests, when shooting with me in the Banjar Valley once witnessed a scene in which a sambar hind attacked a leopard in the same way and drove it up a tree: unfortunately the leopard succeeded in retaining its hold of the sambar fawn which it had just seized. Both leopard and fawn were in the fork of the tree about 12 ft. from the ground. The mother ineffectually attempted to get at the panther. Mr. McCrie's arrival dispersed the scene and the young fawn dropped to the ground and was sufficiently uninjured to admit of its being left for the mother's return.

The stags do not fight in the presence of the hinds or for their possession, and there is no attempt to round up a herd as in the case with Barasingha and many other deer. There are other deer which fight for territory; and if one reflects this would be the natural procedure of an animal living in thick forest where the collection of a herd is an impossibility. Included with the possession of the valley are the hinds which frequent it, and these are attracted to the stag by his call and the powerful odour emitted by his facial glands. It is only for a brief period that the master

stag will be found in company with the hinds and as a rule only a few at that, eight hinds being the most I have ever seen together. Immediately after the rut most of the big stags lead solitary lives, and smaller stags will be found along with the hinds. Big stags often come out in a beat with hinds, but this temporary association is due to the common danger.

Fighting takes place long after the rut is over, as big stags continue to be jealous of their valley and resent the intrusion of a stranger. Several times I have even known this carried so far as to result in one stag severely wounding another while a beat was in progress, the stranger having been driven into country which did not belong to him. When issuing their challenge, stags frequently select the base of a tree with a leafy overhanging branch. A Ghatbor (*Zizyphus xylopyrus*) tree commonly meets with their approval and a regular hollow will be found pawed out of the ground underneath the branch. When engaged in this, they will also stand right up on their hind legs and remain preaching some time. I have seen a stag repeat this performance a number of times: the reason cannot be explained. I have also seen a stag reach up on his hind legs to pull a leaf, but this preaching at the time of the rut has no connection with a quest for food or to displace fruit as has been suggested. In preaching in this way, I have seen the stag's antlers become entangled in the overhanging bough, and this no doubt has given rise to the story that they swing by their horns.

The young are born shortly before the rains. The period of gestation has been stated to be eight months, but on what authority I do not know, as I have seen newly born fawns in the hot weather which could only

be explained by conception having taken place before the regular rut, or a shorter period of gestation. One or two fawns are born at a time, and these remain with the mother for two years : it is probable therefore that many hinds only calf once in three years. At all times, stags are fond of wallowing in mud, and particularly addicted to this practice immediately previous to, and at the time of the rut, and will then visit their favourite wallows even at mid-day. In the early mornings also in winter, in districts where frost and severe cold are common, one will often find a whole herd of sambar lying in the water. The heavy mist rising off the stream shows that the water is warmer than the surrounding air; and strange as it may appear, the animals are actually lying in the water to keep themselves warm.

The food of sambar consists chiefly of grass, coarse grasses growing on the banks of nalas forming a staple diet in the hot weather ; but they also browse to a considerable extent and eat the leaves and young shoots and fruits of a variety of plants. The flowers of the Mohwa (*Bassia latifolia*) tree are also regularly eaten. The fruits of the Aola tree (*Phyllanthus emblica*) are also a favourite food. In addition they take toll of the crops in the vicinity of the jungle. The stems of certain trees are also barked by sambar, one of the favourite species being the Haldu (*Adina cordifolia*). But few haldu trees up to a certain age in the Forests of the Melghat have escaped barking by sambar or bison.

The habits of the sambar are chiefly nocturnal and they retire to cover at an early hour, and are late risers in the afternoon ; this is especially the case with old stags. Their favourite haunts are thickly wooded hill-

sides in the vicinity of cultivation : it is a mistake to think that the centre of some vast forest remote from the past or present habitation of man will contain many sambar. It is quite rare to find more than a few deer in such places ; the only animal which prefers such surroundings is the bison. In lying up for the day, sambar usually select the side of a water-course about two-thirds of the way up the hill, and in hunting them one can act on this assumption. The question as to whether sambar require to drink every twenty-four hours has been answered in a variety of ways. The nature of the question hardly admits of solution. I can only say that I have never seen them in places where they would have any difficulty in drinking every night : it may be assumed therefore that they do.

Sambar possess three well-defined calls. The commonest call uttered is the sharp, short "pook" they give when alarmed. They continue to utter this so long as they consider cause for alarm continues : they are particularly apt to "pook" or "bell" before discovering the nature of the intrusion, and if this turns out to be a man they will decamp and cease to repeat the alarm. On the other hand, they will remain in sight of a tiger or leopard and continue to "bell" or "pook" at them. Some of the aboriginal tribes claim to be able to distinguish between the "bell" or "pook" of a stag and a hind, and although sometimes unmistakable, I have often found the noise of the two sexes to be indistinguishable. The bellow or challenge of a stag roaring, although of the same nature as the cry of alarm, is of course a quite different sound. It has been likened to various noises, perhaps the most accurate description is "a loud metallic

bellow " and is more prolonged than the cry of alarm.

In addition, they possess a death cry which is seldom uttered. It consists of a prolonged hoarse scream. Other means of communication are by stamping the ground with the fore foot, and this is the usual method of drawing attention and also summons the fawn to its mother.

Like most animals which live in thick jungle, the eyesight of the sambar is only moderate, but to compensate for this they possess most excellent powers of hearing and smell. Both these powers are constantly used for purposes of self-protection, and as sambar form one of the chief foods of the tiger and the wild-dog, as well as having been constantly hunted by man from time immemorial, they are largely dependent on the high development of these senses for their very existence. In addition, they possess to an eminent degree the instincts of self-preservation and can instantly act in a variety of different ways in order to avoid danger or to deal with an awkward situation.

The sambar has developed faculties and instincts to a degree not attained by any other deer in the plains of India. In spite of being a common animal, in order to secure a really good specimen of this species, the hunter will generally encounter more difficulty and uncertainty than in the case of any other deer or antelope. It is hardly going too far to say that given a jungle which contains any of the animals mentioned in this book in fair numbers, and picking the season, a good hunter would be fairly certain of securing a good specimen of any selected species within fourteen days, save the sambar, and it might even be months before he achieved his purpose, assuming this to be the acquisition of a 40 in. head. This being so, I need enter into

no apology for dealing later on at some considerable length as to how to hunt this animal, as, given the requisite knowledge and skill to deal with sambar, the sportsman will find no difficulties over the other deer and antelope.

The sportsman must not infer from hearing a mob clattering out in a beat that sambar are noisy animals. They are quite the reverse. They creep through the jungle noiselessly, halting every few steps and listening. They are thus usually apprised of the approach of their enemy long before the latter is aware of the sambar. If the nature of the animal which is approaching is revealed, and dangerous, he will often silently remove himself. If not, he retreats to a suitable bush and peering through the leaves awaits the approach, and on sighting, wheels round and is gone. Anything approaching down wind is at once detected and identified and if necessary the sambar again silently disappears. In addition to being able to walk they can almost gallop silently, and it is impossible to follow the direction they have taken for any distance by the sound they make.

If aware that they are so placed as to be unable to get unsighted at once they will slink and crouch through the bushes, making use of all available cover. If lying down and suddenly sprung at close quarters, they gallop off without displaying that fatal curiosity so common in many deer and antelopes. When galloping off stags carry their heads thrust out before them so as to enclose the neck and shoulders between the horns, and the skin on the top of the neck is abnormally thick as a protection against blows from overhanging branches. If thoroughly exposed and "happened upon," I have several times seen them squat like a hare

in the hope that they would be passed undetected: they seemed conscious of the danger of declaring their presence in an exposed position. These instances will give the hunter some idea of the intelligence of the animal he is pitted against, and he must also remember that a really good stag has only become so by reason of the fact that he has for years constantly and successfully avoided danger, not only from men like himself, but also from a far more formidable animal, the tiger. Their behaviour in beats will be described when beating is dealt with.

Animals' habits and natures are liable to modification according to the country they live in: the great mass of the forests in the Central Provinces consist of miscellaneous species associated with teak. Broadly speaking, the Sal area only covers the south-eastern portion of the Province. Stalking and hunting in the Sal forest is an easier task than in the teak areas, but this apart, it has been my experience that sambar seem to show less vigilance and cunning in Sal forests than they do elsewhere. Is it possible that as in these areas they share "the lives of the hunted" with other animals to a greater degree than in the teak forests, their constant vigilance is relaxed?

The best and commonest method of hunting sambar is to stalk them. To do this successfully, the best plan is to be on one's ground as daylight comes in, especially during the cold weather. If the hunter's enthusiasm does not rise to both a morning and an evening stalk, it will repay him to abandon the morning stalk towards the latter end of February, as about this time the animals change their habits, and more sambar will be encountered under shootable conditions in the evening than in the morning.

The essence of stalking is to discover the animal before it is aware of one's presence. To achieve this is the difficulty, as may be seen from the habits and cunning of this animal. In the majority of cases one fails to detect them in open country, and even if they have not yet entered the denser forest, it is astonishing how easily they can be concealed. The golden rule is to make rapidly for the most promising country and then proceed at a snail's pace, constantly halting and looking long and carefully in every direction. It is better to cover one mile carefully in an hour than to double the distance in a careless manner: these remarks are of course relative, as the pace depends on the ease or difficulty with which the country can be thoroughly inspected. In nine cases out of ten, it is by being in a hurry that the sambar becomes alive to one's presence. Unless the visibility is exceptionally good, the quest should not be attempted down wind. Deserted village sites inside the forest often contain fruit-bearing trees and are resorted to by animals and are often well worth visiting.

The sportsman will often be confronted with a hillside of dense forest opening on to cultivated ground and with no intervening area of scrub. A good plan under such circumstances is to ascend the hill to about half way up and make one's shikari follow along the foot about four hundred yards behind. When disturbed by him, the deer move up hill. In approaching a stag, it is often impossible to avoid making a noise. Deer when moving through leaves trail their feet and make a continuous rustle. They are therefore more tolerant of a noise of this nature than they are of the "crunch, crunch" they associate with danger. The rustle is produced by slowly dragging one's feet, and by doing

this one can often cover the last few yards which bring one into the desired position for a shot. It is apropos to mention that when a tiger stalks an animal—and it will be admitted he is a far more silent and invisible object than a man—he will take a quarter of an hour to cover country which the ordinary sportsman will attempt in two minutes, and not only content with reducing noise he will carefully place his foot on a dead teak leaf and slowly crush it into dust without a sound. It is impossible to teach anyone to stalk game in cold print. These remarks are only in the nature of hints, and are of course lost on the experienced shikari who will, nevertheless, it is hoped, endorse them. At all times sambar have a strong acrid smell, especially pronounced in stags during the rut, which can be easily detected if the hunter knows what to smell for; this can be of the greatest assistance and is often the initial intimation of the proximity of a stag.

If questing by day, the hunter should search the crest of the hill and the water-courses leading off the same. A favourite wallow or salt lick may also be stalked. Sambar are much addicted to salt. One often comes across large holes licked out of some bank of a nala, and deer will sometimes be found at these places in the early morning. In hunting in the evening, one must bear in mind that the animals are then moving down. It is always worth while waiting to the last moment and returning to camp in the dark. There is more chance of bagging a good stag in the last ten minutes of daylight than during any other period of the evening stalk.

Another method of killing sambar is to employ dogs: one or two terriers are sufficient and should be sent round with a few men and enlarged on the face of a

hill-side, the gun placing himself at the other end, taking care to choose the end which is down wind. The barking of the terriers will indicate the level along which the deer are coming and the hunter can shift his position accordingly. If a pack of hounds is slipped on a stag, touch is soon lost, but if one makes directly for the nearest stream in the line of the hunt, the stag will be found at bay in a pool of water. Sambar are soon winded, and given any sort of "going" a good pony will rapidly be on "terms." I have proved this by riding them more than once, and on one occasion having a warrantable stag before me, I speared.

In country which is much intersected with deep jungle clad ravines, typical of the Melghat, and which in consequence are not very wide, an excellent plan is to station oneself on some commanding point on one side, and get one or two men to move quietly up the other so as to move the deer. They then can be seen and shot across the intervening valley. This plan can only be practised from February onwards, when the fall of the leaves has reduced the cover.

A number of the stags shot in the Central Provinces are procured in beats. Before describing how to beat, it is pertinent to discuss the pros and cons of the ethics of beating, as this method of killing sambar has been condemned as being "unsporting," and it appears to me that the other side of the question has never been adequately presented.

The case for this school of thought is, that so long as it is possible to obtain a shot by wandering about in the forest on chance, this method is the only legitimate way of procuring a trophy. There is no forest in the Central Provinces which absolutely precludes a stag

being obtained in this way, though there are many places where it is a matter of great difficulty, requiring a very high standard of wood craft and knowledge of the animal; so much so that hunting does largely result in wandering about "on chance." To enhance the difficulty of obtaining a trophy, while admittedly placing a higher value on the same, does not necessarily imply a higher degree of sport; to leave the result largely to chance would not be considered by many to contain much of the elements of sport. The real sportsman pursues his game intelligently and with purpose and tries to eliminate chance. The case against beating is that it makes the killing of sambar too easy and that, bar the actual shooting, the sportsman takes little part in securing the trophy. It is true that in many beats the arrangements are left entirely to the natives, no one present having sufficient assurance or knowledge to assume charge. Experience remedies this; moreover, by what other means is it to be acquired? In nine cases out of ten unless the beat is thoroughly well organized, sambar break back, and no animal except the bison is more difficult to bring up to the guns. I can assure the critics of beating that to arrange a successful beat for a particular old stag requires more skill and knowledge than is entailed in wandering about the jungle "on chance," and the man who can do this has every right to consider himself a sportsman and a good one at that—he is seldom condemned by his companions for doing so. Most of the sambar shot in beats are got in general beats in which anything may come out. Is this to be debarred? Moreover, when a party are together and time is limited, these general beats are the only means of covering the ground and giving all a fair chance.

Driving stags is a recognized method requiring much skill, regularly practised on the Continent. It is also practised in the highest and most sporting circles in Scotland under easier conditions than those usually found in India. To condemn the practice therefore as being unsporting shows a lack of clear thinking on the subject.

Before proceeding to explain a few of the finer points in driving deer, it is pertinent to describe what usually happens. A large body of men tramp up the hill-side making a considerable noise, not only by talking but also in tying up the "machan" in a tree. A line of stops then goes out on each side, one or other of which must certainly be winded by any animal approaching the guns. The direction of the wind has often not been studied, and the line of guns is placed for convenience sake so as to avoid undue trouble or exertion. The beat then begins, the beaters often shouting, the noise every now and again rising into a roar as the animals break back, and the men come up to report that several fine stags were seen.

Now, in driving deer, one must remember that one is dealing with an animal whose very existence depends on his successfully avoiding danger; his whole training is to this end and he is thoroughly well equipped for doing so. Other animals, such as the carnivoræ, are not trained or equipped in this way, and they are consequently much easier to drive and can be coerced into going to the desired spot. Deer can only be moved or coaxed to the guns. They cannot be driven or coerced, and if they are once thoroughly convinced of the danger ahead, nothing will induce them to go on. The very greatest precautions therefore are necessary not to arouse their suspicions. The wind should be carefully

studied, and no spot chosen which is likely to be commanded by approaching deer. Unless dangerous game or ladies are present, a machan should be dispensed with so as to avoid noise, and absolute silence observed. This advice is subject of course to the ground admitting of fair visibility.

In my opinion, a regular line of stops is a mistake as they more often than not turn the deer back. Deer when moved tend to work up hill: assuming that the face of a hill is being beaten a few men at passes on the crest are useful. These should not await the arrival of a deer before making a noise, as it is then too late—they should make a slight noise from time to time so as to let any animal know beforehand that the pass is occupied. The beaters should advance without shouting, merely tapping two sticks together. In order to keep the line, one selected man on each flank and one in the centre can occasionally give a shout. Loud shouting induces the impression that they are being coerced and tends to make them break back. Deer when breaking back, gallop through for a short distance, and then pull up and stare towards the beaters' backs, seemingly thoroughly conscious of having broken through. I have shot several fine stags by following on behind the beaters, and if there are plenty of guns it is an interesting thing to do. In breaking back, stags and even hinds will knock beaters over, and I have experienced two cases in which stags put their heads down and regularly charged, inflicting a dreadful wound with the fore tine. On one of these occasions, I was in the beat and saw a stag which had halted just out of sight of the guns. I massed the beaters. We advanced in a solid wall to within twenty yards, when an old Gond threw an axe. On this the stag came

right through us with his head down, and it was either the stag's selection or the irony of fate that out of about fifty men it was this old Gond that "got it."

A large number of beaters is usually a mistake, and twenty men will often do more good than two hundred. Fifty men are all that are needed, provided they keep their spacings and line. A common practice on the Continent, where the deer are also given to breaking back, is to turn the beat on arriving at the guns and beat straight back. The deer break back again and come slowly out of the cover towards the guns. On several occasions on which I was certain that a number of fine stags had broken back, I adopted this plan with complete success. As a rule, however, the lack of faith in the other guns and the beaters results in this proposal being abandoned. Stags when moving forward are generally preceded by the does, and if possible these should always be let through the guns without being disturbed, otherwise the stag may not follow.

Natives are fond of selecting a fireline as a stance. As a rule few worse places can be chosen, as the deer are always suspicious of crossing an open space, and make a very thorough inspection before doing so, and when they do finally make up their minds often come across at a gallop. The open space is therefore largely discounted by the pace of the animal. A fireline or road is often a convenient route to the stance, but this should be one hundred yards inside the forest. Deer will readily cross a river, and a stance on the opposite bank to the beat is often an excellent place, as the forest on the side of the beat is not disturbed. One stop on each side on the beaters' side of the bank and well out on each wing, is all that is needed.

As already stated, he has many enemies to contend with, and in addition he is a slow breeder. Nevertheless, owing to his cunning and the faculties nature has endowed him with, he succeeds in holding his own.

The tendency of the Government reserves under conservation to become denser has also been in his favour. On the other hand, he is liable to contract epidemic diseases, and rinderpest and foot-and-mouth disease sometimes decimate the stock in a particular tract, in which they subsequently take a very long time to recover. A large stock of animals of this size cannot be expected in any particular area, but sambar will continue indefinitely to be found in fair numbers in many of the forests of the Central Provinces.

CHAPTER VIII

THE SWAMP-DEER OR BARASINGHA

This deer is one of the handsomest representatives of the deer tribe that exists in the world, and of all the Indian deer, both in appearance and on account of his proud carriage, most strongly reminds one of the European stag. This general resemblance does not imply any relationship between the animals. There has been some discussion as to his name, and the suitability of referring to the animal as a swamp-deer. This term aptly describes his habits in the Terai, where he is hardly ever found out of swamps; on the other hand, it is a complete misnomer for the Central Provinces, where there are no swamps for it to frequent. In these Provinces therefore it is more frequently referred to as the Barasingha, i.e., "12 pointer."

This animal has been found from the neighbourhood of Haldwani eastwards along the foot of the Himalayas as far as Assam, throughout Assam and parts of Bengal. It has also been reported from Upper Sind by Blanford and this is repeated by Lydekker. It would be interesting to know whether it still exists there, as I have never had the fortune to meet with anyone who had come across it in this locality. In these areas the animal inhabits grass lands, islands, river banks, swamps, and the vicinity of swamps inside the forest. The great majority of the animals I saw in the United Provinces were standing in water in long grass, and they seemed to spend their whole

time in localities of this nature, only emerging at dusk to wade up to their bellies into deeper water in order to graze off water weeds. When disturbed by a line of elephants they rushed about in the grass and water, and it was only by the most persistent hunting that they could be induced to forsake their cover and make for the forest. In fact it was a matter of no small astonishment that the animals' feet and legs could withstand the continual soaking they were subjected to.

Sportsmen who have only had experience of the animal in the Central Provinces will read the above with surprise. In this part of India no swamps exist in the sense that they do in the United Provinces, but this apart, the animal shows no special addiction to water, and he is less exacting as regards a plentiful water supply than the Chital. The *sine qua non* for this animal's requirements are large grassy plains or maidans on which he can graze. He lives in or along the edge of these plains, and only penetrates the jungle-clad hills to a short distance. The distribution in the Central Provinces is as follows: The Jagmandal and Banjar Reserves of the Mandla district, and thence eastward to Amakantak and the Bilaspur Zemindaris, where a very few of the countless herds seen by Forsyth still survive. There are two isolated herds, one north of the Nerbudda, near Sarastal, and the other in the neighbourhood of the Dindori Road in the Shahpura Rangè. The Sal forests of Balaghat, Bilaspur and Raipur and adjacent Zemindaris, the Bastar State, parts of Bandara and South Chanda contain this animal.

It has been asserted that the Barasingha confines himself to Sal forests, but this is not so, as he occurs in Jagmandal and in Bandara and South Chanda in

ordinary mixed forest. There would appear to have been a few barasingha in the out-lier of Sal forest round Pachmarhi at the time of Forsyth, but all my enquiries showed that they are now extinct, and the tradition of their ever having existed was lost, but rumours of their persistence in the Chindwara Jagirs are still current, but require confirmation.

The distance to which the Barasingha extends into the neighbouring Province of Bihar and Orissa is not known. The tribes on the borders of the two Provinces are inveterate hunters, and using poisoned arrows have exterminated nearly all the game over a vast tract of country. It is unlikely, therefore, that many barasingha have escaped.

The swamp-deer of the Terai and the Central Provinces are undoubtedly the same animal, nevertheless there is an indescribable difference in their appearance—a general impression, too elusive to lay hold of. The only definable differences are, the whiteness and smoothness of the horns which are a common feature of the Terai animal: dark, almost black, horns with white tips are rare, but are often found on master stags in the Central Provinces. In this Province the animal is also often much darker than any I saw in the Terai. The hoof also is hard and well knit, the hoof of an animal accustomed to gallop on hard ground, whereas in the Terai the hoof gives one the impression of being spongy—the heel pads as well as the whole hoof are larger and have a tendency to splay.

Considering the very long period that these animals have existed under such very different conditions, it is surprising that much more marked differences have not developed. It may be argued that at one time the Central Provinces animal did inhabit swamps, but this is untenable. As, although some of the plains

they now frequent may have been swampy at a very remote period, others certainly never were so.

The description of the swamp-deer's appearance requires to be re-written. Lydekker states: "With the exception that it retains in most instances a line of whitish spots on each side of the dark dorsal streak, the swamp-deer is as uniformly coloured an animal as the sambar, and like that species exhibits no marked seasonal change in the colour of the coat." This statement is however qualified later on by the remark that "the coat of adults is in most cases nearly uniformly coloured."

The ordinary colour of the animal is brown, shading to yellowish brown on the lower parts. Females are lighter in colour, the hair is moderately fine and often woolly in texture. The necks of stags are maned. There is often a darker dorsal line, and it is common to see master stags so dark all over as almost to appear black in the distance. The under side of the tail is white or light yellow. There is a marked seasonal change in the colour both in this animal and the sambar. As the hot weather advances they become much lighter, the stags being reddish brown and the does yellowish brown. At this season also they develop spots. These spots are arranged in precisely the same manner as those of the Chital; they are not white, but the hair is merely somewhat lighter in colour, or may even only be apparent when viewed at an angle, when they appear as water marks.

The first occasion on which my attention was drawn to these marks was on May 11, 1902, when I shot a stag. This is an extraordinarily late date for a warrantable stag to be carrying his horn, and as the spots do not commonly appear until after the horns drop, their presence often escape the notice of sportsmen.

Out of many scores of animals I have seen shot, I have never noticed these spots on the winter coat, nor have I ever seen a white spot. Without shooting the animal it would often be impossible to say whether it had spots or not, but so far as one can discover by the use of a glass I am inclined to think that some animals never develop spots at all.

The young when born are spotted in the same way, but the marks are much more distinct and might be called whitish. This phenomenon would seem to indicate that the animal was at one time spotted like a chital, and these are the last vestiges of that condition.

The following are the dimensions of a good average stag shot on March 12, 1903. Taking the measurements from the tip of the tail:

To the rump	9 in.
To the withers	4 ft. 6 in.
To a point between the horns	6 ft. 3 in.
To the tip of the nose	7 ft. 4½ in.
Girth behind shoulder	4 ft. 4 in.
Height	3 ft. 11 in.
The horns: Right	33 in. and 7 points.
Left	32 in. and 6 points.
Girth	5½ in. above brow line.

Blanford, quoting from *The Asian*, gives weights of 460 and 570 lb. These animals were from Cooch Behar which seems to have been a wonderful place for producing remarkable animals. The stags of the Central Provinces are in no way inferior to those of other parts of India. In fact they excel all others in size and beauty of horn, but they cannot compete with these weights. The stag referred to above was 370 lb., and 420 lb. is an extreme weight.

There are two types of horn, typical examples of which are described below, and but for the fact that all degrees of intermediary types are found, one could

hardly credit that they belonged to the same animal. In one case, the beam is a regular curve in the shape of a scythe curving from the skull backwards and then forwards so as to bring the point of the horn into position in a line with the top of the head. At intervals along the beam and commencing rather more than half way up, tines are given off, the first tine generally producing a shoot of its own. This type of head seldom attains a large size, and is ugly and not to be compared either in beauty or size with the other type.

In this type, the horn, instead of being curved from the base, grows comparatively straight up, but with an outward curve so as to produce spread, and only at the point where the first tine appears does it begin to curve forward, which it does abruptly, so that the last foot or so of the beam is horizontal. The tines develop vigorously, and throw off two or more shoots, and a number of large tines growing straight up vertically from the horizontal beam produce one of the most beautiful horns in the world. I have been given to understand that this type of horn is rare outside the Central Provinces. Out of thirty-one mature heads in my possession I have made the following classification :

Central Provinces type	.	.	.	.	.	6
Intermediate	.	.	.	.	.	14
Teral or curved type	.	.	.	.	.	8
Sambar type	.	.	.	.	.	3

The brow tines are long and very pointed, and come off at a right angle from the beam ; it is never forked but often has "sports" which grow on the tine itself, not from the axil.

I believe I am correct in saying that the number of heads exceeding 41 in in length which have been

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I. TWO VERY FINE SPECIMENS OF CENTRAL PROVINCES BARASINGHA.

The one on the left has an exceptionally fine spread.

	Lengths.		Points.	Girth.	Spread.		Weight.
	Beam.	Brow tine.			Tip to tip.	Widest inside.	
	in.	in.		in.	in.	in.	lb.
Left . . .	34½	15½	7	5½	44	44	13
Right . . .	35	15	7	5½			
Left . . .	40½	13	7	5½	43	44½	14½
Right . . .	40	13	9	5½			

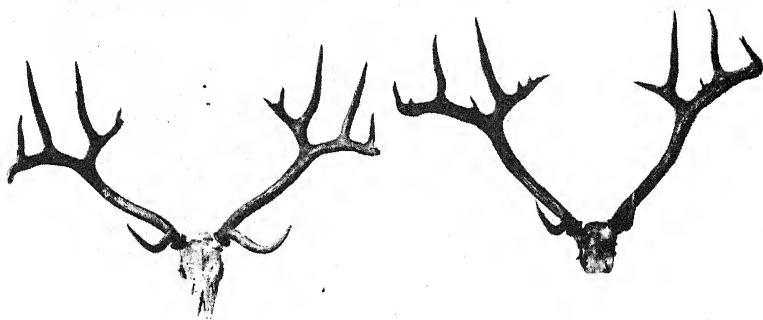
II. On the left. BARASINGHA'S HEAD OF THE CENTRAL PROVINCES TYPE.

On the right. NORMAL OR TERAI TYPE.

III. BARASINGHA'S HEAD OF SAMBAR TYPE.

	Lengths.		Points.	Girth.	Spread.		Weight.
	Beam.	Brow tine.			Tip to tip.	Widest inside.	
	in.	in.		in.	in.	in.	lb.
Left . . .	35½	14¾	3	6	27	29	11
Right . . .	35½	14¾	4	6			

I.



II.



III.



shot, could be counted on one hand. Heads having eighteen and twenty points have been procured, but ten to fourteen is the usual number carried by a mature stag. Bigger heads than those so far shot may yet be killed, as really old stags are exceedingly wary, and I have found dropped horns in the Mandla district which in size and girth were things to dream about, and much heavier than anything yet bagged.

Before leaving the subject of horns it is necessary to refer to one more type. It is not uncommon to see a large dark stag with a horn very much resembling a sambar's, or possibly only to the extent of having one more point. I have seen a number of these animals shot, and after Mr. Eardley Wilmot raised the possibility of their being the result of hybridization they were naturally examined with special care. Beyond the shape of the horn, and that such animals were usually large and dark in colour, I could detect no other signs which suggested sambar blood. Moreover, I once shot a light-coloured stag having no resemblance whatever to a sambar except his horn. A stag of the sambar type was shot during the shoot of His Royal Highness the Duke of Connaught in the big maidan of the Banjar Valley, Mandla. Having a number of other heads freshly killed for comparison, it had to be admitted that the skull of this particular animal was somewhat larger than that of the others.

Skulls of stags however vary very considerably in size, and I came to the conclusion that this was mere coincidence. The stags of both species find an abundance of hinds to satisfy all their desires. Moreover the rut of the two species does not coincide, although it may overlap. In the country inhabited by the two species the barasingha stags are actually and relatively more numerous, and their breeding season extends

a longer period. Moreover, sambar hinds have been seen more or less associating with a herd of barasingha, whereas sambar stags never do this. In addition, there are other reasons for thinking that if hybridization ever did take place, it would be between a barasingha stag and young sambar hind. The subject however need not be elaborated, as the most natural explanation of these heads is that they are one of the modifications due to the animal no longer living in a swamp, and that, as his mode of life and the country he lives in differ but little from that of many sambar, the same influences which produced the horn which this animal now carries are at work on the barasingha.

The following is quoted from Lydekker: "In spring the members of these herds disperse: single stags being met with on the grass plains of Assam during March with their antlers in velvet." I am in no position to contradict this statement as regards Assam, but it is certainly not true with regard to the United Provinces or the Central Provinces. The herds do not disperse in spring, and stags do not shed their antlers until April, and many small stags are still in horn at the end of the month. To find a stag in velvet in March, presupposes that the horn was shed in February or even January.

Barasingha commence to grow their horns shortly before, or at the commencement of the rains, coincident, as in the case of most deer, with the approach of the period of plenty. At this season the stags lead comparatively solitary lives, and the large mobs of hinds break up into small lots. The horns are clear by the end of October, and the stags then congregate together for a period awaiting the development of the rut. It is common in November to find a number of stags dotted about a small maidan and issuing

challenges without having yet commenced to fight. The sexes at this time are separate, and small mobs of stags will be found together. At this season the grass is almost over their heads, and one can often see what appears to look like two small haycocks moving about, this being a bundle of grass caught up in the stag's antlers.

In cleaning their horns they rarely resort to the stem of a tree. The shape of their horns would militate against this. Moreover, the grass serves the purpose, and extra polish is arrived at by merely twisting and butting their heads into a shrub.

The actual rut is an ill-defined period, as I have seen a stag jump a hind in December and also in March: but the chief breeding period is between December 15 and January 15, and the great mass of the fawns are born in the hot weather, shortly before the rains. The master stags collect a herd of does and fight for the possession of their harem in the same way as the European stag. This is contrary to the habit of the sambar which fights for territory. A big stag will collect as many as thirty hinds, far more than he can possibly look after. These are surrounded by a number of young stags who give the "sultan" no peace, and it is not uncommon to see him vigorously pursue some particularly enterprising youngster: when so occupied, the others, profiting by his absence, jump some of the hinds. This stage however is of short duration, and the master stags soon abandon the harem and retire to some pocket of a maidan in the jungle, whence they issue after dark and stride across the plain, issuing a challenge which is more in the nature of a call to an unsatisfied hind than an invitation to battle.

At the height of the rut they are extraordinarily combative and many a fine trophy is spoiled by being

broken. When fighting, all sense of other dangers is forgotten, and at night it is by no means uncommon to hear the clashing of their horns from the tent door, while in the daytime one can approach as near as prudence dictates. After this, the big master stags soon join up into small herds of eight or ten animals, all of about the same size, apparently bored and satiated with "the season," and leave the rest of the breeding to the smaller animals.

This clubbing of the big stags is rather curious, and indicates a social preference, as even long after all jealousy has disappeared they will not tolerate a youngster with them. Possibly they still remember and resent the trouble the youngster and his kind recently gave them, or they desire to avoid the danger of association with an inexperienced animal. When once assembled in this way, the big stags retire to some secluded maidan or pocket, and no longer associate with the others. If disturbed, they move right away and occupy some other haunt. At this time—February and March—numbers of warrantable, but inferior stags, will be found in the big maidans along with does, and the inexperienced shikari is apt to shoot his limit of game from these, without being aware that finer trophies are procurable. The very finest stags of all are more exclusive still, and either live alone, or have one other companion of an equal calibre, and select the most secluded maidans of all for their retreat.

As compared with ordinary stags, the intelligence of an experienced old beast is remarkable, and on giving one's wind to a herd he will often make straight for the jungle at full gallop while the others are merely showing signs of alarm.

Barasingha are noisy animals, and on being alarmed scream loudly the whole herd, and even other adjacent

ones, taking up the chorus : the noise is a shrill "bray" and they will utter this while trotting away from the cause of alarm. The attention of the herd is first aroused by a stamp of the foot, and the young fawn is summoned to the mother's side in the same way. In common with most deer they possess a "coronach" or death call, which they utter more frequently than in the case of other animals, and although they seldom give vent to this when shot, they often do so when seized by a tiger or leopard. Nevertheless I have seen a noble stag on receiving a death wound stand up on his hind legs and continue the call until he fell dead, and a wounded animal on being knived not uncommonly utters it. The sound defies description, but it is in the nature of a prolonged and agonizing scream, which at once conveys to the hearer that a tragedy has occurred.

The "roaring" of the stags is a sound which cannot be compared with that of any other wild animal in India : it has been likened to the "ee on ee on" of a donkey, but this gives a very inadequate idea of what it is really like. The noise commences with a loud and penetrating "Ring—Hon Ring—Hon," which is repeated in gradually decreasing volume as the air in the lungs becomes exhausted ; but in addition to this call there is an accompanying drone which is kept going all the time the call is being repeated. No one who hears this call for the first time can help being struck by the strangeness of the sound, and few will escape without having a feeling of undefined weirdness engendered in his being. Even amongst those who are accustomed to the sound, conversation at the camp fire usually ceases until the call has ended.

Barasingha are much less nocturnal than sambar. They will often be found grazing as late as ten in the

morning. About this time they lie down in the long grass : a herd will often occupy the centre of an old abandoned field where the grass is only a few inches long. No doubt such a position ensures against surprise by a tiger or a leopard, which are their chief enemies. At the same time it indicates a high degree of tolerance to the sun. They are constantly attended by Indian Minas which settle on the deer and remove the ticks with which they are infested—these birds also pick up insects which are disturbed by the feet of the deer. About three o'clock they rise and commence to graze.

Their food chiefly consists of grass, but the young leaves of sal and a few other species are eaten ; the quantity thus eaten however cannot be considered a diet.

Their eyesight without being remarkable is moderately good, and consistent with the semi-open life they lead. The degree of development of the eyesight of a deer depends on the terrain he inhabits, and animals which frequent open country have good eyesight, whereas those which live in thick cover have poor eyesight. The reason for this is fairly obvious, as in thick cover deer do not, and cannot, depend on eyesight for protection. Their powers of hearing are moderate. On the other hand, their sense of smell is excellent, and I have known them wind a man at 400 yards. Compared with most animals they are tame and confiding, and are lacking in the instincts of self-preservation when hunted. If stalked and charged by tiger they only move a short distance, and get stalked and charged again. Owing to the country they live in enabling one often to see them at a great distance, and also permitting one to approach closely without disclosing one's presence, no animal gives the field naturalist more opportunities of observing its habits, and through them, the habits of wild animals in general.

Most hunters, and all who have made a study of wild animals in a state of nature, must have sometimes been conscious of the fact, that the animal under observation has become aware of his presence under conditions where his having been seen or heard or smelt seem to be precluded.

One can often approach a herd of barasingha lying peacefully on a bare field, and protected not only by the wind in one's face, but by a perfect wall of high grass. It is extraordinary how soon an old doe gets up and shows signs of uneasiness, shortly followed by several others, until the whole herd is aroused, and stands at uneasy attention, hesitating what to do, and unaware in which point of the compass the danger lies. Some animals have a mysterious means of being aware of an enemy or of being "overlooked." The comparatively recent announcement that certain manifestations had been observed on an instrument resulting from "eye force" seemed to be a clue to the phenomenon, but this theory must be abandoned as these manifestations have since been shown to be due to other causes.

The attitude of science towards this subject is—there is no organ to deal with a sixth sense. The field naturalist in spite of his precautions has disclosed his presence in some way unknown to himself. The feeling one sometimes has one's self of being overlooked, say in church, to turn round and find this is so, is due partly to the reason that one does not remark the occasions on which no one is looking, and partly to the fact that in turning round, some one's attention is drawn, who then looks. Another explanation is that the animal discovers one's presence by means of some hypersensitive development of hearing or seeing or smell. In my opinion, this does not adequately meet the case, one of the chief objections being that the animals,

although alarmed, are for a long time unaware in which direction the danger lies, their attention is not directed on the spot where one lies concealed. The behaviour of bats when deprived of sight is inexplicable, it having been stated that they can fly about and avoid objects. I hesitate to introduce this point as the few experiments I carried out did not confirm what previous observers had recorded. It must be admitted that many of the ways of animals cannot at present be explained. Although the tendency of science is to be more tolerant, it is probable I shall lay myself open to some criticism in advancing the theory that some animals have a mysterious and unexplained means of feeling one's presence ; nevertheless, if the storm bursts I expect to be able to weather it in good company.

The recognized method of hunting barasingha is to stalk them. Nothing can be more delightful than to make an early start in the cold weather on an elephant, and work round the edges of a maidan in one of the Sal forests of Mandla or Balghat. Well wrapped up against the cold, which is bitter, relieved from the dripping grass, and all the discomfort of having to pick one's way, the sportsman from a commanding position can devote his whole attention to what is going on around him. The mist still rising off the water, the jungle still awake and on the move, with game in sight the whole time, the sportsman making from point to point of the Sal forest so as to inspect the intervening bays of grass maidan, has his interest not only sustained but also keyed up to the highest pitch. The animals in these forests are not so unfamiliar with the tradition of the wild elephant as to stampede at the approach of the tame animal and they seem unable to recognize the men on the elephant's back ; provided therefore the wind is right, it is generally unnecessary to dismount in the habits of wild animals in general.

order to obtain a shot. In fact many animals will stand gazing in a state of stupid curiosity.

If no elephant is available the hunter has to proceed on foot : but an excellent plan is to ride a pony whose approach the game will also tolerate. There is a large amount of curiosity in the barasingha's nature. If on foot the sportsman will be constantly baffled by the long grass, and having spotted a good stag from some rising ground, may be unable to see the beast when within shooting distance, and unless there is a handy ant hill he is helpless. A small double bamboo ladder about 5 ft. long should therefore be carried by the gun bearer. This can be set up at any time and will be found invaluable.

Barasingha have a fairly strong smell and a herd can often be detected when lying down in long grass at quite a distance. The smell much resembles that of the European deer. In addition the presence of game when standing in concealing cover can often be detected on a cold frosty morning by the steam rising off the body and the presence of minas.

Barasingha can also be driven with ease, applying the usual principles in vogue for other deer. An excellent place for the "machan" or stance is just at the edge of the Sal forest, as good stags often slip out of the grass and come along its fringe. If the sportsman is not hurried for time, and is not content with an ordinary head, he is strongly advised to abandon hunting the country where the deer can be seen in masses, and instead, to investigate carefully all the small outlying blanks in the forest, even those of only an acre or two in extent. During the sleeper works of 1902-3 I had occasion to burn the big maidan in the Banjar valley, which came up in short green grass and proved an irresistible attraction to all the surrounding game.

On one occasion, in one evening, I counted approximately 1,500 head of big game, consisting of eleven different species. Excellent riding country resulted from burning the grass, and I was able to prove that after a mile of hard going a good pony rapidly gets on terms with a barasingha stag. I left Mandla in 1903 and revisited it as Divisional Forest Officer in 1919, and again in 1920 as Conservator of Forests in charge of the shooting camp of His Royal Highness the Duke of Connaught. The place was still full of game, but the "glory had departed from Israel" and there was no comparison with the earlier years.

Barasingha are much preyed upon by tiger, leopard, and wild-dogs, and they can do little more than meet this demand. Although liable to suffer from epidemics such as rinderpest and foot-and-mouth disease, they are far more immune and suffer far less casualties than sambar and bison. The reason of the decline in numbers is poaching, and is largely due to the increase in number of guns, both licensed and unlicensed, amongst the surrounding population. Many of the guns are held under licences issued purely for purposes of crop protection, but needless to say, the owner does not confine himself to this, and if he does not actually use the gun himself, it is lent out. Although the barasingha never interferes with crops, he is easily killed, and has been exterminated over large tracts where in Forsyth's day he was to be found in hundreds.

Nevertheless, the protection of the game laws, and his own habit of breeding freely, ensures his presence in parts of the Central Provinces for many years to come. To contemplate that the proud challenge of this beautiful stag might shortly cease to re-echo through Sal forests of the Highlands of Central India would indeed be sad.

the habits of wild animals in general.

CHAPTER IX

THE CHITAL OR SPOTTED DEER AND THE BARKING DEER

The chital, the third largest deer inhabiting the plains of India, while lacking the imposing grandeur of a fine sambar or barasingha stag, nevertheless in balance, grace and beauty, rivals, if it does not surpass, any deer in the world. The general colour of a chital is rufous fawn, covered with white spots. The arrangement of these spots gives one the impression that they are the vestiges of what were once white longitudinal stripes. This is very clearly indicated in the two lines of spots bordering the dark dorsal ridge; further, the spots in the lowest line bordering the ventral region are often joined together, and form a continuous line. The under surface of the body, including the tail and the extremities of the legs, as well as the throat and under surface of the chin, are white. Stags are furnished with a brown chevron on the forehead, and a dark band above the muzzle. There is no marked seasonal change in colour, but stags at their prime and before being "hard run" are slightly darker: this is especially noticeable in the black band which extends from the back of the neck along the whole body and which at this season is such more pronounced.

A good average sized chital stag measures 36 in. at the shoulder and weighs 190 lb. Although specimens from Ceylon, the Sunderbans and Southern India, are somewhat smaller, both in the size of the horn and the

body, the various attempts to classify these animals as a distinct race cannot be justified. The animal reaches its most perfect development in the Central Provinces, in the Terai, and amongst the sub-Himalayan foothills. Chital are often local and isolated in their distribution, the conditions which they insist upon being a plentiful water supply and open gladed forest. They are exacting as regards these conditions, and are never found permanently inside dense forests or far from water. In consequence of this, their eastern distribution is restricted by the dense forests of Assam, and in the west by the waterless tracts of the Punjab and Rajputana; elsewhere they are to be met with throughout India. They are tolerant of man, will live close to villages, and under conditions which necessitate their being constantly seen and disturbed. Compared with other deer therefore, they are tame and can be easily shot.

The antlers are reddish brown. The beam, which curves backwards and outwards in a lyre-shaped formation, is usually about 32 in. long and produces a tine on the inside about two-thirds of the way up. The brow tine comes off at approximately a right angle. In old animals one or more "sprags" are generally developed on the brow tine close to the axil. Abnormalities are rare, and beyond difference in the spread and curvature of the beam, there is little variation of type. Lydekker gives the record length as $38\frac{1}{4}$ in., with a girth of $4\frac{3}{4}$ in. Major Stockley has mentioned a head of 39 in.; it is probably correct to say that the 40 in. head has yet to be killed. Anyone who procures a 36 in. chital with a girth of 5 in. in the Central Provinces can consider himself lucky, and it is probable that unlike the sambar and the swamp-deer, large heads more commonly occur in the United

Provinces. In these Provinces also chital are more numerous and sometimes collect into immense herds; in the Central Provinces herds of over thirty animals of both sexes, or of ten stags together, are unusual. Stags will be met with in full horn at all seasons of the year, but, nevertheless, they have a regular period, and I have never seen a stag without horns in April or May.

The great majority of animals drop their horns in August, begin to grow them towards the end of the rains, and are in velvet up to December when they commence to clean their horns by rubbing on a bush or small tree. Most stags are in full horn by March. It has been suggested that the irregularity with regard to the period during which they carry horns is correlated with the date of birth. Newly born animals, as well as stags in horn, are found at all seasons, and it seems to me that the two phenomena may have simply been associated without any evidence of there being any connection between the two. There is a distinct rut in the end of April and the beginning of May, when most of the breeding takes place, and during this period it is rare indeed for a fully mature animal not to be in full horn. Most of the animals found in velvet or in horn at irregular times have not reached full maturity, and it is probable that the stags do not develop regular habits until they have attained this stage of development. It would seem, therefore, that the age of the animal is an important factor, and that animals which have been irregular, in the course of time, drop this habit.

Previous to, and during the rut, the stags fight for hinds, which they endeavour to collect much in the same way as the barasingha do, but are less ambitious regarding the size of the harem. Stags will also fight at other seasons, and I have twice come across cases of beautiful

stags having been killed by a deep thrust in the ribs from a rival's horn. The period of gestation has been variously stated at six and eight months. I have no definite knowledge on the subject, but judging from the date of the majority of the births consequent to the rut in May, I should say six months was probably the more accurate period. One to three fawns are born at a time, two being a common number. After lying concealed for a few days in a bush, they soon join their mother in her rambles, and with their gambols and inordinately long tails, which they frequently carry stuck out behind, they introduce an element of frolic into the somewhat sombre and tragic atmosphere of the jungle. Chital are prolific breeders: they need to be. In addition to often producing two at a birth, six months after another family will be on its way.

In addition to a death scream, chital possess two calls. The commonest is the shrill whistle they utter when alarmed. In addition, the stags when roaring make a somewhat kindred sound, i.e., of the nature of a whistle, but louder and longer than the cry of alarm. Living in semi-open country as they do, none of their senses is specially developed. They have moderately good powers of eyesight, scent and hearing, and according to circumstances, depend equally on all three senses, especially the two former, for their safety.

Chital exercise little of the constant watchfulness of the sambar. He is of a more light-hearted nature and seems to prefer to enjoy life rather than to preserve it. They are chiefly preyed upon by leopards, wild-dogs and tiger, if they happen to inhabit a jungle containing tiger, but this is often not the case. In fact, they often exist where, barring man, their only natural enemies are occasional leopards. On the other hand, very large numbers are the victims of crocodiles.

Fawns are liable to be killed by hyenas and jackals. But when in a helpless state it is a remarkable provision of nature how scentless the young of deer are. This seems to be specially so in the case of chital, and I have known my dogs on two occasions fail to detect young chital which had been "cachéd" by their mothers under conditions which indicated that there was no scent at all.

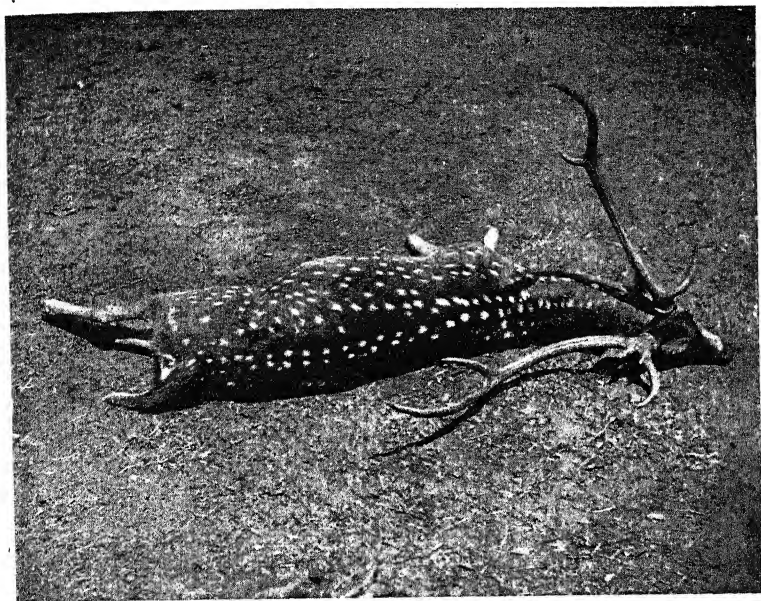
The behaviour of a young chital on one occasion illustrates in a remarkable way the feeling of protection wild animals sometimes get from the presence of man. I was stalking a herd of barasingha just at dawn. I was a few yards inside the Sal forest bordering on a grass maidan, when I was suddenly startled by the unearthly death scream of some animal a few yards off. A young chital bounded out, and on seeing me rushed up and stood trembling, literally between my legs. At the same time I made out a large tigress, walking broadside on, and eyeing me about 20 yards off. I promptly let fly with the mauser I was carrying. The tigress gave two or three huge bounds and then turned and charged. Not wishing to receive a charge with so poor a weapon of defence, and knowing that my gun bearer who was only 20 yards off had a loaded .577 in his hand, I covered the intervening space in level time, accompanied by the chital. To snatch the rifle and whip round was the action of a moment; there was nothing to be seen; the tigress had collapsed during the charge. The chital accompanied us for a little way, but on getting near the tiger, parted company. We found a young barasingha fawn of the same size as the young chital, bitten through the neck. The two animals had probably been together when the tragedy occurred.

Chital are less nocturnal than any other deer.

in the plains of India, and will be seen grazing late in the morning and early in the afternoon. Grass, the leaves and fruit of certain trees, and village crops, form their chief diet.

Chital are endowed with no special interest to a sportsman or the naturalist. Owing to their tolerance of man, and the nature of the country they inhabit, they are very easily stalked and shot. For the same reason they are very easy to beat out to a line of guns. When ridden, they show fair pace, and will charge if ridden "off" cover.

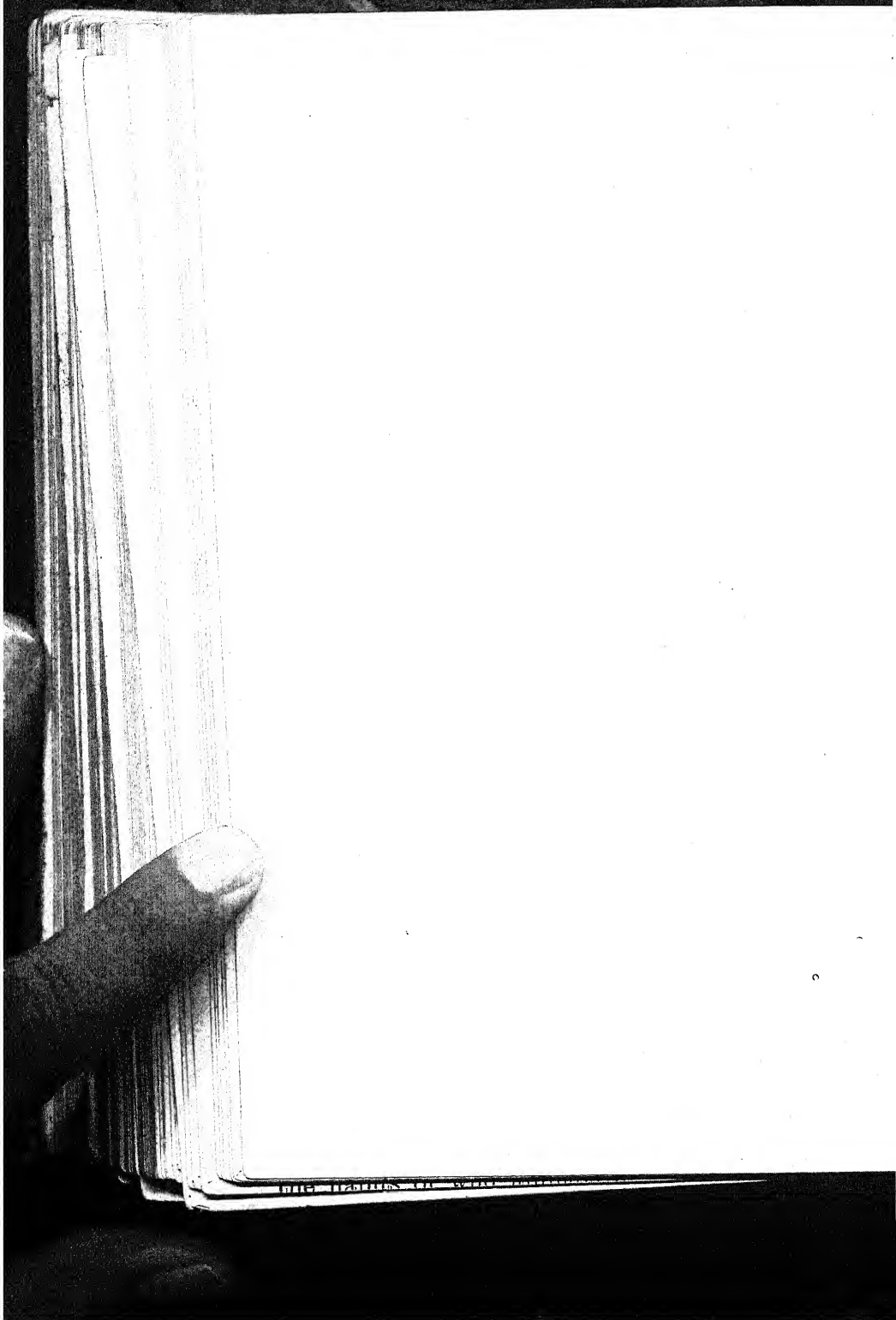
The only occasion on which I stuck one, an incident of this nature occurred. The circumstances were as follows. There is a Babul (*Acacia arabica*) forest in the plains of Berar. The forest is small and runs to a point, and is surrounded on all sides by open cotton fields. It was the regular abode of innumerable nilgai, chital and black buck. The game could be driven into this point, and when pressed, came out, and cantering into the fields, went round the end of the beaters and so returned to the main block of forest. I was accompanied by the late Capt. Peto of the 10th Hussars. Our plan was of course to induce the game to get well out into the open, and in order to effect this purpose I had men posted out in the fields to a considerable distance, so as to enlarge the circle the deer had to take when breaking back for the forest. By these means we induced a mob of nilgai and chital to get right away from the cover. When it was deemed safe to commence riding, Capt. Peto, who was mounted on one of the fastest horses in the Regiment, went right away from my polo-pony; but judging that when pressed the stag would make for cover, I took a line so as to intercept this manoeuvre, and presently found



A 36-IN. CHITAL STAG.



BARKING DEER. RASTAR TYPE.



30 yards separating us. The stag tried to jink behind the pony, but foiled in this by the handiness of the pony, he suddenly put down his head and came bounding in. The attack, which was on the near side, took me completely by surprise, and it was more by good luck than anything else that I managed to fend him off by a spear in the neck. But for this, the pony would certainly have been killed. Anyone who rides chital is therefore cautioned to beware.

Of all the animals in the jungle the chital is the most sociable and tolerant of others. His tolerance of man has already been mentioned. In addition they do not object to village cattle, and they are largely immune from the diseases which cattle so frequently convey to jungle animals. Chital will often be seen more or less associating with barasingha, nilgai, black buck, and even pigs, as well as lungoors—in fact the behaviour of chital and lungoors gives one the impression that they are sometimes on friendly relations. Forest conservancy tends to produce a denser type of forest than the chital prefers. On the other hand, the tendency of the privately owned forests is to become too open. Nevertheless, there will always be abundance of areas along river banks suitable for their habitat, and although easily shot in many places, their comparative immunity from disease, and their prolific breeding habits, ensures their continuance in numbers in many parts of the Province.

THE BARKING DEER

Only one more member of the family Cervidæ remains to be described, namely, the muntjac or barking deer. Owing to their marked structural differences, muntjac have been classified as a separate genus under the name

Cervulus. It is unnecessary in a work of this nature to detail all these differences as the reader will gather from the general description of the animal that it is widely separated from the genus Cervus. In appearance the barking deer is a small, thick-set animal, and seen at a distance, in a superficial way, reminds one of a roe-deer. A closer inspection dispels the illusion. The colour is a deep chestnut or dark foxy red, paler below and darker on the back.

The inside of the thighs, the under surface of the tail, the lower abdomen and the chin and upper portion of the throat are white. In some specimens parts of the white are faintly tinged with brown. The skull possesses a curious facial rib which in males is prolonged into the horn-pedicle; hence one of its other names; "the rib-faced deer."

These ribs at their lower extremity converge towards the middle of the face but never unite. A black line runs along the inside of each pedicle and is continued along the inside of the facial rib. Lydekker, in his work, implies that the ribs are due to a prolongation of the pedicles, but the examination of immature skulls and those of females indicates that this is not so, and it is the facial rib which continues to grow on beyond the skull and forms the pedicle which in turn carries the horn. The general colouration of the limbs and face is brown. Cases of albinism are not unknown. The facial rib in females ends in a small tuft of hair often containing a wart-like core. Females are also generally somewhat lighter in colour all over. There is often a whitish spot on front of the digit on each foot.

The most peculiar feature of the buck is the long hairy pedicle which carries the horn. The bone of this, though slender, is covered with very thick rubber-like skin and with the covering of hair appears stouter

than the horn it supports. The pedicels vary considerably in length but average about 4 in. measured from the back of the skull up to the burr. A local variety carrying abnormally long pedicels occurs in Bastar State and adjoining territory, and I have measured a few extreme cases in which they were $5\frac{1}{2}$ in. long.

The horn consists of a short brow tine given off at an acute angle from the beam which grows up for 3 or 4 in. and then curves sharply inwards, giving a total length of about 6 in. measured round the outside curve.

The largest head I ever shot in the Central Provinces measured as follows :

Horn, outside curve.	. . . . .	7 in.
Girth . . . . .	. . . . .	$3\frac{3}{4}$ in.
Tip to tip . . . . .	. . . . .	$3\frac{1}{2}$ in.

Although nothing out of the way for Java and the Malay Peninsula, where the best trophies are found, this head is a long way above the average for the Central Provinces.

A good buck weighs 48 lb. and stands 24 in. at the shoulder ; females are 15 lb. lighter and measure some 3 in. less. The muntjac is very widely distributed and is found throughout India, ascending the Himalayas as high as 5,000 to 6,000 ft. ; also in Ceylon, Burmah, the Malay Peninsula, Java, Sumatra and Borneo. It is never found in the plains and does not habitually frequent open country even inside the forest. Its favourite habitat is thickly wooded bamboo-clad ravines, where they will be found singly or in pairs ; occasionally a family party of three or four is encountered. They are distinctly local, however, in their distribution, and many seemingly suitable localities do not contain this deer. Mention may be made of its unaccountable absence from the forests of the Khandwa District north

of the Nerbudda, and I am informed that it is not found in the Kinwat jungles of the Yeotmal District.

In many respects this little deer and its ways are an interesting study, but he receives little attention and often escapes being shot as the sportsman is usually intent on something larger. They shed their horns in the hot weather, and these commence to grow again at the beginning of the rains and are clean before the rains are over. It has been mooted that they do not shed their horns annually, but I have never seen anything to confirm this. The rut takes place in the cold weather and the fawns, one or two in number, and which are spotted, are mostly born in the hot weather. During the rut the males often fight fiercely and their chief weapons of offence are their long upper tusks. These are sharp and protrude about $\frac{1}{2}$ in. from the gum. They are not fixed firmly into the jaw but are retained in position by the surrounding tissue and can be moved, and it is probable the animals can control their position to a certain extent. The wounds these tusks are capable of inflicting are astonishing, and I have shot bucks, which had been fighting, with deep gashes on the face and neck. I have known them round on a fair-sized dog and inflict a wound on the back of its neck that if placed a little lower would probably have been fatal. When brought to bay they show extraordinary courage and they will even stand up to a man.

Barking deer possess three cries, which although all different, are of the same nature. That most commonly heard is the loud sharp bark which they give at intervals when disturbed or alarmed. For so small an animal the volume of sound is extraordinary. Of all the deer they are the most ready to sound an alarm, and will continue to do this, keeping the object of their annoyance in sight. In fact, they are one of the chief

advertisers of the jungle, and the sportsman has often reason to bless them when he has lost touch with some carnivorous animal he has been hunting. Another cry of alarm is a series of continuous short cackling barks uttered when galloping away: the noise is much less loud than the usual cry of alarm, and it would seem as if the air instead of being expelled in one rush was spread out over a series of notes.

Several previous writers have referred to a peculiar rattling noise they make when moving away, likened to "a pair of castanets," and various explanations have been suggested, namely, that it might be caused by the feet or the canine teeth. I have no doubt that the sound referred to is the same as that which I have described above, and having heard it at close quarters on innumerable occasions, I am equally certain that it is merely a modified form of the usual cry of alarm owing to the animal being in motion at the time, which results in the noise being jerked out. The usual cry is uttered when the animal is standing still. Frequently during the rut and occasionally at other times, the stags utter a mate call which is very similar to the cry of alarm, but louder and more prolonged.

The habits of the barking deer are regular; they will occupy the same ravine throughout their lives and are not given to trekking or going far afield for their food. In this they are extraordinarily dainty, and daily eat a large variety of different things—grasses, buds, flowers, leaves and a large assortment of different kinds of fruits. They are the most select feeders in the jungle, and possibly on this account their flesh is superior to most animals, but during the rut the large facial glands of the bucks give off a strong-smelling secretion and the flesh is goaty and uneatable. Some authorities have referred to them as being coarse feeders. This is

entirely contrary to my experience and certainly untrue as regards the Central Provinces animal.

They are very thirsty animals and drink regularly every evening at an earlier hour than most deer. When moving about the forest, they go at a slow mincing walk, picking their feet up into the air and placing these down again slowly and almost vertically. This action, which they habitually adopt, probably accounts for the abnormal development of the muscles on the forearm. At the gallop they are clumsy and their action gives one the impression that they are going down hill. They have a fair turn of speed for a short distance, but are soon blown, and a pack of dogs will speedily run them down, but unless these are running by scent, the barking deer will double and conceal itself, thus often escaping.

The chief desideratum of a barking deer is to be unobtrusive and avoid notice, to creep silently about the same ravine all his life, and but for his habit of barking, one would often be unaware of any existing in the neighbourhood.

I once kept a barking deer as a pet, and an excellent one it made. Like many wild animals, it was much addicted to drinking hot water, and I can confirm the observations of others to the effect that they will eat meat. In fact, I once saw a barking deer in the jungle snuffing round a tiger's kill in a way that suggested that the wild animal might also be guilty of this practice.

Another peculiarity of the animal is the extraordinary length of its tongue, with which it habitually licks most of its face.

Barking deer are much preyed upon by leopards and wild-dogs, and a good many are killed by natives with the help of village dogs. Like most animals

which lead semi-solitary lives and are lacking in the social instinct, they are never numerous.

There is no recognized method of hunting these little deer. They often come out in beats or are seen when stalking, but the hunter usually reserves his fire for something better. Nevertheless, the sportsman who is interested in the ways of wild animals and can spare the time will be repaid by devoting a few evenings to the study of this animal. In order to do this, it is best to work along some deep shady ravine at dusk on much the same lines as those advocated in the case of sambar.

CHAPTER X

ANTELOPES

Compared with deer, the generality of antelopes which inhabit open country are lacking in interest to the field naturalist. There is a general sameness about the individuals of any given species. The horns of one specimen are generally an exact replica of another, only varying slightly in spread or length. A particular tract will produce horns up to a certain limit, and another tract produces horns of exactly the same type, only slightly larger or smaller as the case may be. There is none of the variation found in antlers which makes the development of the stag's horns so interesting. Moreover, unlike deer, antelopes do not shed their horns, and are thus lacking in the interest attached to marked seasonal changes, recognized breeding seasons, sexual calls, and many other points of interest possessed by deer. Further, they do not call for much skill on the part of the hunter, as their cunning and protective senses compared with deer are but poorly developed, and they rely chiefly on speed and rapid reproduction in order to survive the struggle for existence. The reader will, therefore, understand that in treating of the four antelopes which inhabit the plains of India, there is not much to say and the account of each species is necessarily short. Although referred to generally as "antelopes," each animal belongs to a separate genus, only one of which is *Antelope*; the other three genera being *Boselaphus*, *Tetracerus* and *Gazella*.

THE NILGAI OR BLUE BULL

This, the largest antelope found in Asia, is confined to India, where it is found from the base of the Himalayas as far south as the vicinity of Mysore, in the Eastern Punjab, Gujerat, the North-west Provinces, and parts of Bombay. It is not found in Eastern Bengal or Assam, or anywhere east of this, nor in the Malabar coast of Madras or Ceylon. Although it has been an inhabitant of India from the very earliest times, as fossilized remains testify, its absence from Ceylon, as well as its distribution generally, can be accounted for by its never permanently inhabiting large stretches of dense forests. Nilgai insist on more or less open forest and scrub lands. They are particularly fond of open grassy hill forest sparsely covered with trees, but will also inhabit open cultivated plains provided there is a modicum of cover to hide them during the day.

In appearance, a bull nilgai is a large clumsy-looking animal with high withers and drooping quarters, standing between thirteen and fourteen hands at the shoulder. The length of the body from the nose to the rump is 6½ ft., with a tail of about 19 in. long. The weight of a large bull is 600 lb. The colouration in an old male is a dark bluish grey or bluish black. There is a white ring above and below each fetlock. In addition, the abdomen, the lower surface of the tail, the chin, the lips, the inside of the ear and two spots on each cheek are white. The mane, which is common to both sexes, the tip of the tail, and the throat tuft, which is only found in males, is black, as well as the upper portion of the outside of the ear. The general colour of females and young males is brown. Only the males carry horns, which are black and triangular at the base but

circular at the tip. In old males a ridge on the front edge of the horn develops forwards and inwards so as to almost meet, at the same time the tips of the horns become worn down to mere stumps. The best horns are found in young males shortly after they have assumed the adult colouration. Horns of $8\frac{1}{2}$ in. are good, but a specimen of $11\frac{3}{4}$ in. has been recorded. Considering the bulk of the animal the trophy is paltry, and not to be compared with his African cousins the eland and the kudu. The hair is short and wiry, and beyond the fact that bulls appear bluer and cows yellower in the hot weather, there is no seasonal change.

Solitary old bulls or perhaps two old bulls together will often be met with, but the great mass of animals usually consort in herds of about ten to fifteen animals.

They are much more diurnal in their habits than deer, and much more tolerant of the sun, retiring later in the morning and rising earlier in the evening. They resort regularly to village crops and often play havoc with these. They both graze and browse, and are given to eating a number of jungle fruits, amongst which may be mentioned Aola (*Phyllanthus emblica*) and Ber (*Zizyphus jujuba*). The fleshy calyx of the Mohwa is also a favourite food. They appear to me to be largely independent of water and they certainly do not require to drink regularly in the cold weather, and I have known them even in the hot weather to inhabit places which made it exceedingly unlikely that they drank regularly.

The period of gestation is eight to nine months, one to two young being born at a time, and no sooner is one family born than it frequently happens that another is on its way. This is evidenced by the frequent occurrence of young of two different ages being with the mother. I have found newly born calves at so

many different seasons it is impossible to say they have a regular breeding period, but by a slight majority the most of the births take place shortly before the rains.

When wounded and in difficulties they sometimes utter a loud complaining B—A—A—E, and in addition they make a grunting sound which is a cry of alarm. These are the only two sounds I have ever heard them make. When attacked by dogs they defend themselves by striking these down with their fore feet in the same way as sambar hinds do. Their senses are moderately developed, they have fair powers of eyesight and of smell, but only moderate powers of hearing. They are large clumsy animals with no sense of concealment, and gallop off with their heads up like a "star gazing" horse. In doing so, such blows as they receive are taken on the neck and chest, and in consequence in this region the skin is an inch thick, whereas on the top of the neck it is thin. This is exactly reversed in the case of sambar with his different carriage.

The chief quality possessed by the nilgai is his ability to gallop over the most impossible ground at full speed, and although I have only seen one come a "cropper," that they do so frequently and recover is witnessed by the state of their knees which in old bulls are generally in a hairless warty condition.

They have an interesting habit of regularly resorting to the same spot to deposit their droppings, large accumulations of which are often seen. The places selected are always in open ground, or if inside the forest in an open patch, thus eliminating a surprise attack. The reasons for this habit, which is common to many animals, is difficult to explain, and I only venture to postulate a suggestion which may be some clue to the phenomenon. I can testify that nilgai use these

spots as a general "rendezvous" for the reassembly of the herd, which often gets scattered during the course of the night. The time when this takes place coincides with the animal's habitual desire to relieve itself. Is it possible that this habit may be in some way connected with facilitating the reassembly of the herd?

Rhinoceros, and four-horned antelope, two widely different animals, but both of which habitually either lead solitary lives, or go about in pairs, conform to the same practice. Both animals, even when paired, constantly get separated. Is it not possible that this habit may be a useful means of reuniting them? or again, that a single animal coming on or scenting a place habitually used by another, and being desirous of consorting with a mate, knows that by visiting this spot at a particular time he is likely to accomplish his object? Certain it is that both animals under the conditions in which they live would often seem to require every possible assistance in order to meet each other. Many sportsmen must have observed various phases of this habit, which if co-ordinated, must throw considerable light on this very curious phenomenon. The behaviour of nilgai when assembled in such places is sometimes most peculiar, and I have seen considerable jealousy displayed by bulls regarding the use of the spot, one animal rushing in and driving off another while it was about to relieve itself. Is it possible that the sole use of these spots carries with it priority in recognition on the part of some errant doe? As already stated, these remarks are only in the nature of theories. I can only vouch for the facts which have often puzzled me greatly.

Nilgai are preyed upon by tiger, wild-dogs and leopards, and no doubt their young are killed by hyenas

and jackals, but at the same time they often inhabit country where they have few natural enemies except man, and he is chiefly responsible for keeping their numbers down. Although moderately endowed with protective senses, they are such stupid animals that with modern weapons shooting nilgai affords little or no sport, and they can be approached or driven with equal ease. Most sportsmen, therefore, only shoot them with the object of reducing their numbers, or to test a new rifle, and no other animal can be more suitably selected for this purpose, as they are incredibly tough.

The only sport which nilgai afford is to ride them, but it is seldom they are found under rideable conditions. Nevertheless, the late Captain Peto and myself succeeded in killing six bulls in two mornings' hunting in Berar. We found that an old heavy dark bull was rapidly overhauled, but that young beasts which had only just assumed the blue coating tested the horses' endurance to the utmost, and that unless one seized some opportunity to thoroughly stretch the nilgai and thus blow him, the hunt was interminable and the nilgai escaped. When closed with and speared they made no attempt to charge, but in blundering across one's line gave one a bad foul likely to result in a toss. On the other hand, when wounded and cornered, I have known them very occasionally to charge in a clumsy meaningless sort of way. Lydekker states that in past ages the nilgai was associated in India with the eland and the kudu whose fossilized remains have been found. One cannot but wish that these most noble species had persisted instead of the nilgai, which, considering its size, has the ignoble distinction of carrying the poorest trophy in the world, out of all the numerous animals classified under the large family Bovidæ.

THE BLACK BUCK

The black buck is the commonest and most conspicuous antelope in India. They are found from Cape Comorin to the base of the Himalayas, and in the Punjab from the neighbourhood of the Jhelum as far east as Lower Assam ; also in Orissa, and in the coastal region of Midnapore. They are not found east of the Bay of Bengal, nor in the Gangetic Delta, the Malabar coast or Ceylon. This distribution is in accordance with their requirements, as they prefer open plains and are not found in swampy land or thick cover. They flourish most abundantly in Rajputana, Hurriana and the western portion of the Punjab and adjacent territories of the United Provinces, where also the most perfect development takes place. They are found throughout the Central Provinces in all the open country, and inside the forest wherever open grass maidans of sufficient size occur. The greatest numbers, however, are seen in the plains of Berar, the Nerbudda valley in the Hoshangabad and Narsingpur districts, and in Saugar. In these tracts also the finest heads are developed, animals carrying horns of 26 in. being obtainable in Hoshangabad. Specimens from the main Satpura Range and the continuations thereof seldom exceed 22 in., and unlike deer, therefore, hilly country does not tend to produce long horns.

The horns are a long cylindrical spiral. The number of turns of the corkscrew-like spiral varies from three to five, and in very large specimens may even be as much as six. Although the length of the horn depends to some extent on the number of spirals, it is also largely dependent on these being of an open or elongated nature, and the shortness of the horn in hilly tracts is chiefly due to the closeness of the twist : much in the

same way that a spiral spring lengthens or shortens according to its being stretched or closed. A pair of horns in my possession when measured straight or round curves are $23\frac{1}{2}$ in. and $29\frac{1}{2}$ in. respectively, whereas a pair of curved horns from the Satpura Hills measure $19\frac{3}{4}$ in. and 31 in. The ridges or rings found on all horns in the course of development become slightly displaced so as to conform with the spiral, and are more pronounced on horns having a short twist. The growth of the horn is of some interest. In the first year these have no twist and resemble in general type those of the Indian gazelle, having similar ridges arranged horizontally on the front of the horn. In the second year one large open spiral develops, and as the horn continues to grow this twisting, which must tend to reduce its total length, increases until the full number of spirals are developed. When this has taken place, at the end of the third year the buck begins to assume the black colouring which has given him his name. Females very occasionally develop horns irregular in type. I know of one specimen in which the horns curve down on each side so as to bring their points below the head. Out of the thousands of heads procured every year in India, the great mass vary but little. Differences in spread may occur anywhere, but the length chiefly depends on the part of India in which they are shot, and in any given particular tract no great variation takes place.

Travelling south from Rajputana there is a general and gradual diminution in length, and the poorest heads come, therefore, from the south of the Peninsula. Also good heads are procurable in the western portion of the United Provinces, but thence as one travels east the length of horn diminishes. The upper portion of does and young bucks is yellowish fawn, the lower

parts are white, and the two colours are sharply divided by a pale lateral band. Old bucks are a very dark brown, almost black above, and the pale lateral band often disappears. The nape of the neck generally remains brown, and there is an irregular white patch round the eye. Some bucks, although mature, remain brown and the assumption of the black colouration seems to be retarded. Such animals are often of large size.

Sportsmen, in the middle of the last century, refer to a breed of albino buck in a particular part of Gujerat, and I have been informed that this tendency still persists. A case of Melanism has been reported from Bhopal.

A good buck measures 32 in. at the shoulder; the length of the head and body is about 4 ft. with a tail of 7 in., and the weight is 90 lb.

The largest known head carries horns of over 30 in. measured in a straight line—in other words, only slightly less than the height of the animal itself. The qualities of a very common animal are apt to be overlooked. It is, therefore, necessary to emphasize the fact that probably no antelope, taking its size into consideration, carries so fine a head. Why the nilgai should be at the other extreme is one of these insoluble puzzles of nature. India is indeed the land of contrasts. In addition to the above, the black buck is the fastest four-footed animal in the world, and this will be referred to at some length later on.

Black buck usually consort in herds of from fifteen to twenty animals, sometimes as many as forty being found together, but unless driven and so massed, the huge gatherings sometimes seen in Rajputana do not take place in the Central Provinces. Their habits are regular. They will be found grazing in crops or a

grass maldan up till about eleven o'clock when they slowly retire to some field or a bit of scrub jungle not likely to be disturbed and lie down for the day, rising again in the evening about four o'clock. The buck often separates from the herd in the afternoon. The morning is, therefore, the best time to stalk, especially as in most of the country which they frequent, the does are much more conspicuous and easily seen than the bucks. Black buck breed at all seasons, but the chief rut is about March, and most of the fawns are born shortly before the rains. During this season the buck fight and chase each other. They can often be seen stalking about in a curious stilted manner with their heads thrust out and with their large facial glands everted, which at this season give off a strong smelling secretion. When doing this, they frequently grunt. Does make a sort of "hiss" when startled or alarmed and unable to ascertain the cause, or when their curiosity is excited. They are inquisitive animals, and I have known them approach an indistinct or curious object to their own undoing. The only other noise I have ever heard them make is a "bhaa-ing" sound, when caught by dogs or in difficulties.

One or two fawns are born at a time. These the mother "cachés" for a few days in grass or a bush, but the youngster soon develops the use of his legs, and will be seen at a very early age running about with the mother, who rejoins the herd. Buck sometimes congregate into small herds by themselves, and an old buck will often separate himself for the time being from his harem, taking one female with him. Like all deer and antelope which go in herds, the leadership is vested in some old female, and I have no doubt the doe which accompanies the buck acts as his "guardian angel" and relieves him of much vigilance and anxiety.

Black buck frequently deposit their droppings in a common heap, but are less regular in this habit than the nilgai.

The question regarding their drinking habits has often been discussed, and it has even been stated that they never drink at all in some localities. During the cold weather in the Central Provinces the heavy dews supply all the water they need, but I have often seen them drink in the hot weather. At the same time some animals certainly only do so at infrequent intervals, and it would appear that given the necessity, they would be capable of developing into an animal which could dispense with this habit. The occurrence of black buck between the Salt Chilka Lake and the sea in Orissa, where the only drinking water is from wells, is referred to by Blanford as the strongest case against their drinking. I do not think this to be an impossibility. At the same time, some animals will drink salt water, and as I have known black buck to drink from a village cattle trough, it is considered that the mere fact that the only fresh water is drawn from wells in itself hardly establishes the case for their never drinking.

Black buck only possess moderate powers of hearing, and this sense is of very secondary importance; their sense of smell is fair but they have good eyesight, and they rely on this sense and their incomparable speed for self-preservation.

It has been previously stated that they are the fastest four-footed animal in the world, and although they can be stalked and rushed over a short distance by a hunting leopard, they soon draw away and the leopard abandons the chase. Moreover, the black buck can keep up his pace almost interminably. The value of a flying start is well known in racing, and to what extent

this advantage serves the cheetah or hunting leopard I cannot say, but the ease with which this animal can be run down and speared shows that even given his ability to out-pace the black buck for a very limited distance, this does not entitle him to pride of place regarding fleetness. Given it possible to start both animals together, after the first hundred yards or so it would only be a question of by how much the buck was leading, and the further they went, the greater this would be.

No African antelope possesses the speed of the black buck, and I am informed that all those inhabiting rideable country have been ridden down on horses much inferior to those which have been pitted against black buck. The cheetah is a common African animal, but his attention is divided between a large number of different antelopes, whereas in India this is concentrated almost entirely on the black buck or the Chinkara, an animal possessing almost an equal fleetness. Is it possible that this factor accounts for the development of the phenomenal speed, and that endurance has been acquired to escape from the more persistent and tireless wolf?

Claims are retailed from past days of black buck having been ridden down and speared, but unless there was some factor which placed the buck at a disadvantage these can be rejected, and I refuse to credit that given anything like fair terms anything of the sort has ever taken place. I believe that if it were possible to enter a herd of black buck for the Derby and their pace were to be regulated by the slowest animal in the herd, they would come in a solid mob well in front of the horses and, given anything in the nature of jumps or uneven ground, the relative speed of the buck and the horse would be further accentuated.

Incredible as it may seem, a buck with a broken fore leg can only be speared by a strong rider and good pony in country which at all favours the animal.

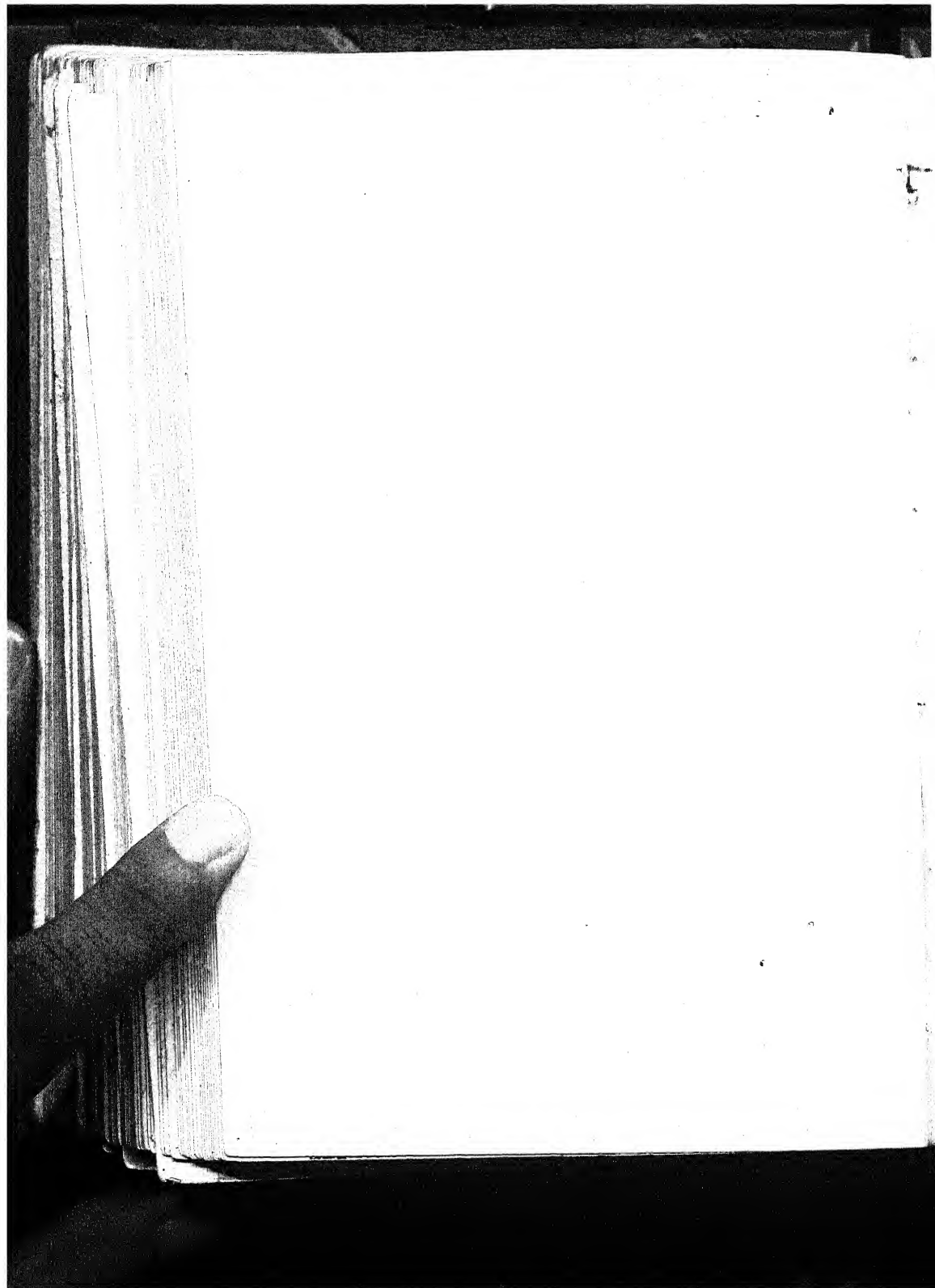
In the rains in soft ground buck get bogged, or pick up clods of earth on their feet, and under these conditions I have killed them with dogs, but given fair conditions I have never seen thoroughbred greyhounds take a turn out of them. On one occasion I had an excellent opportunity of testing this. There was a large herd of buck in a grass maidan inside the jungle. The maidan was double, in the shape of an hour-glass and joined by a narrow neck. If pursued it was known that the buck would make through this neck. I stationed a man there with two thoroughbred English greyhounds and brought the buck along for a mile or so, as hard as I could press them on a big fast Arab. When passing the neck, the dogs were slipped, and these cut in within 6 ft. of the last buck. All the buck immediately went ahead except three does which were probably gravid. These and the dogs retained their relative positions for about 200 yards when the buck gradually drew away, and after going half a mile the dogs were not in it. The going was perfect; there had been a slight shower and the space between the perfect slots when measured showed that when extended the buck covered 19 to 22 ft. at each stride.

Buck, when startled or fired at, frequently bound into the air so as to increase their horizon, and then settle down into a steady gallop, and in taking a sunk road with a hedge on each side I have often seen them fly all three obstacles. On one occasion I saw three buck standing parallel and close to a high fence; wishing to place this between me and them, and standing as they were, they simply seemed to rise into the air and alighted in the same position on the other side.



BLACK BUCK.





A curious habit of buck is to race and cross over in front of anything moving swiftly alongside of them. If one gallops straight at them they move off, and if hard pressed keep a comfortable 30 yards in front; if further pressed they at once widen the gap and then drop back to their old position. But if instead of galloping at the buck one gallops some distance to one side, the buck race ahead and cross over in front of the horse and continue on the other side. One can count on this happening, and when the manœuvre begins, dismount and shoot them. They behave in exactly the same way when engines first begin to use a new section of line. The same habit is now more frequently observed by drivers of motor-cars. In racing these the pace they attain can be fairly well estimated. I once saw a buck beat a Ford car which was "all out" and must have been doing at least 35 miles an hour. It is believed that black buck are capable of maintaining a speed of over 40 miles an hour for a considerable distance.

This habit, which is difficult to account for, is so frequently practised it must be due to some definite purpose on the part of the animal. It is possible that being accustomed to rely on their speed for safety, to race and cross the front of the car gives them a feeling of security and a knowledge that they "have the legs" of it: at any rate, after crossing its path, they usually slow up as if satisfied.

The usual method of shooting black buck is to stalk them. With modern rifles of flat trajectory they are easily killed, and beyond affording excellent practice at a running target, cannot be said to afford good sport or to call for much skill. Where wild and much hunted they can often be approached in the company of natives or in a bullock cart or behind a pony. They can also

be driven. Suitable places for driving are scrub jungle or the broken, uncultivated ground on the banks of a river, places in fact to which they often retire during the day to avoid disturbance by cultivators.

Indians hunt them in a variety of ways, snaring being one of the commonest. The buck are driven into a line of snares with flagged lines stretched out on each wing to act as stops. The snares are commonly made of the sinew of the hind leg of a buck, which is sufficiently strong to hold even a large boar. Another method of catching buck is to promote a fight with a tame animal to whose horns snares are attached, and these engaging on the horns of the wild buck admit of his capture. An old Indian sport which is still sometimes practised in native States is to fly a large hawk trained to molest the buck when dogs succeed in pulling him down.

The number of cheetah now found in the Province is a negligible quantity and buck have comparatively few natural enemies. The young fall a prey to wolves, hyenas, jackals and eagles, and a few are killed by leopards. That jackal will prey on black buck is evidenced by a scene I once witnessed. A wounded buck made through some cover and emerged with two jackals in hot pursuit who ran into the buck and pulled it down. When wounded and making off in this way buck frequently squat or hide in a bush, and when cornered I have known them to charge both dogs and men. The chief enemy buck have to contend with is man, and with the advent of modern rifles of precision their numbers have been very much reduced. Buck alongside a railway get rapidly shot out by officials travelling up and down in trolleys. Any place accessible to a British garrison is liable to follow the same fate.

In addition very large numbers of animals of both

sexes were shot during the war to provide leather jackets for seamen. At the same time buck are still common, and are found in undiminished numbers in all out-of-the-way places, but in most of the accessible areas, often those producing the finest trophies, their numbers have been sadly thinned out. Nevertheless, their prolific breeding habits ensure their survival.

THE CHINKARA OR INDIAN GAZELLE

The distribution of this typical gazelle extends from the eastern shore of the Persian Gulf, throughout the foothills of North-western and Central India, and wherever suitable conditions exist in Sind, Rajputana, the Punjab, the United Provinces, the Bombay Presidency, the Central Provinces and the Nizam's Dominions, extending according to Blanford into Madras south of the Kistna, and also into the northern portion of Mysore.

This authority, as well as Lydekker, apparently copying Blanford, both state that its eastern distribution in the Central Provinces is limited by the Seoni and Chanda Districts. This, however, is not so, as I have come across the animal throughout the Province up to its eastern limits, and it probably extends into the neighbouring Province of Bihar and Orissa, but how far it does so I cannot say. Chinkara may be expected wherever open scrub jungle, low foothills, and ravines along nalas are found. Also on hill tops at the edge of open or cultivated ground. It will not inhabit open plains in the way black buck do, nor is it ever found in heavy forest; its habitat is the intervening country between these two conditions. They usually associate in small herds of from three to seven.

Both sexes are horned, but it is not uncommon to find a particular locality in which the females do not

develop horns. Also the female carries two types of horn. One type is a smooth conical spike, curving slightly inwards at the tips. The other type is more or less straight and distinctly annulated at the base. Lydekker's statement that the horns of the female of the Indian race are devoid of ridges is not correct.

As scientists in classifying the different varieties of gazelle have attached some importance on the female being horned or not, and when horned, the type of horn carried, it may be of interest to note that some of the characteristics on which they have chiefly relied to distinguish the different varieties are possessed by the Chinkara of the Central Provinces, and are therefore mere individual variations not entitling the animal to any special designation.

The horn of the female is usually 4 to 5 in. long, but horns of 7 to 8 in. are occasionally met with. The horn of the buck seldom exceeds 12 in. in the Central Provinces, but specimens from Rajputana run bigger, and 15 in. is believed to be the record. The horn spreads outwards from the skull and arches gradually backwards until near the tip where it begins to curve forwards. It is annulated up to the last few inches, usually with fifteen or sixteen rings or ridges.

A good buck measures 26 in. at the shoulder and is slightly higher at the croup. Bucks weigh about 50 lb. and does are 15 to 20 lb. lighter.

The general colour of the chinkara is light chestnut. The chin, breast, lower portions, including the buttocks, are white. The tail is black. The knee tufts are also either black or dark brown. Each side of the face has a whitish streak bordered by a rufous stripe.

Chinkara have no sense especially developed: all three are moderately good. They depend chiefly on speed for safety, and they are second only to the black

buck in this. I have never succeeded in making any impression on them either with horses or dogs, but unlike the black buck they are seldom found in country which does not give them a distinct advantage.

Chinkara have no regular breeding time. The bucks are sometimes seen to butt each other, but generally they display little jealousy. One or two fawns are born at a time. These are quite helpless for a few days and they are often left in the middle of a bare red-earthed stony field where they lie squatted, and can be approached and lifted without their moving, and if again placed on the ground immediately assume that same position with their necks out and chins on the ground. This is their training or instinct, and like many animals they trust for protection to colouration and the unlikelihood of the spot. Their enemies would not usually cross the middle of a bare open field but would sneak round the cover at the edges. When in this stage they are almost scentless.

Chinkara are more nocturnal than black-buck. They lie up earlier in the morning and come out later in the evening—they can often be seen advancing into the fields at dusk. They have the same habit regarding the deposit of their dung as other antelopes and they often use the same pile as the nilgai.

Their food consists of grass, crops, and the leaves, buds, and fruits of a variety of plants. It has been stated that they do not drink, and although this may be true of other parts of India, it is not so with regard to the Central Provinces, where I have several times seen them in the act; and although they may be able to go for long periods without water, I have never known them living under conditions where they could not get it. The existence of parasites or bots in the chinkara's

back which has been reported from other parts of India has never been observed by me.

The constant flicking of their ears and twitching of their tails indicates that they are annoyed by flies and are intolerant of these, and it is possible that these precautions are against a fly which uses their body as a host. Another indication of this is the very elaborate arrangement of white hairs inside the ear, which cross each other like a series of combs and which are obviously developed to exclude flies. The black buck has a similar arrangement but to a lesser degree.

The usual method of shooting chinkara is to stalk them along the ravines and foothills bordering the cultivated lands. They seldom keep still, and being small they present a very difficult target when galloping over ground which is usually uneven. They are often exceedingly hard to see and much resemble the laterite rocks and the red murrum soil of their habitat. The first intimation one often gets is the twitching of their tails, by which time they are generally alarmed. In disappearing over a ridge at a trot or a canter they frequently change direction as soon as they are out of sight, and the sportsman who follows up and topping the rise to peer eagerly in front of him, will find them at a right angle to the direction last taken. They are intensely inquisitive, and if unable to discover an object will often advance slowly, stamping their feet and uttering a curious call which resembles the word "pitch," pronounced emphatically. I have known them come to within 30 yards of where I lay partially concealed, from a distance of two hundred yards. The only other sound I have ever heard them make is the usual "bhae" of an antelope when seized.

The country which they inhabit would always be capable of carrying a much bigger head of this little

animal than are actually found, and they can never be said to be numerous. Also they are often absent from tracts which have every appearance of suiting their requirements. Few are killed by man, and their natural enemies are the chief factor in regulating their numbers. The mature animal must seldom fall a victim to anything but the leopard, but in spite of the precautions they take, as already related, to safeguard their young, many of these are destroyed by hyenas, jackals, wild-dogs, foxes, eagles and possibly some of the smaller carnivoræ as well.

THE CHAUSINGHA OR FOUR-HORNED ANTELOPE

In some respects, apart from its being possessed of four horns as both its names imply, this is the most interesting antelope inhabiting the plains of India. This animal is only found in India. I have been able to obtain singularly little information regarding its distribution. According to Blanford it occurs along "the base of Himalayas from the Punjab to Nepal"—"in Sind"—"the wooded parts of Rajputana"—"throughout the Bombay Presidency"—"the Central Provinces"—"the northern parts of Madras"; but is less abundant eastward in "Chattisgarh, Chutia—Nagpur, Bengal and Orissa—Mysore and the Nilgri and Palni Hills." It is stated to be absent from the Gangetic plain, and not to be found east of the Bay of Bengal, nor in Malabar or Ceylon. Lydekker adds nothing to this information, which he merely repeats in slightly different words. As the animal so frequently inhabits country where more important game can be expected, sportsmen often ignore it. That the above distribution is correct in the main, I have little doubt, but it is equally probable that it admits of some correction in detail.

The group of antelopes to which this animal belongs is widely distributed in Africa, and is represented by a number of species. Anyone who has seen the duikers of this Continent would at once recognize these as kindred of the Asiatic chausingha. It is singular, however, that Africa, which may be termed the home of antelopes, has developed no duiker possessing four horns. The distribution in the Central Provinces is general but distinctly local. They are occasionally found in scrub jungle, but what they really require is a grass maidan or open forest with an undergrowth of grass. Wherever a stretch of grass is found in the proximity of water, one may expect to find chausingha. They never inhabit open country or dense forest, and they insist on water. They are commonly found in open Salai (*Boswellia serrata*) forests and on the poorly stocked flat hill tops known as "Daddars," both of which types of jungle admit of grass developing. Again, inside and surrounded by dense forest for miles, the small patch of grass land often found just above the scarp of some exposed sheet of rock, will be found to contain a couple of chausingha where apparently they remain and reproduce indefinitely. But without this patch of grass one need not expect to find them.

In appearance the four-horned antelope is a dull light brown animal, which colour shades into the white of the lower parts. The muzzle and ears are somewhat darker, and there is a dark stripe down the front of each leg, more conspicuous on the fore leg, but this colouration is absent in some specimens. The hair is coarse and except in summer often does not lie on to the skin as in the case of most antelopes, and thus resembles the type of coat usually carried by deer. Some animals have well-defined water-marks or spots just above the digits on each foot, which

in extreme instances are almost white. In others, or possibly in different stages of the coat, these marks are entirely absent.

A good buck measures 26 in. at the shoulder and weighs 55 lb. Only the males carry horns; a good head carries posterior horns of 4 in. and anterior horns of $1\frac{1}{2}$ in. These develop on two bony protuberances just above and between the eyes, and thence the skull slopes backwards rather than upwards so as to reduce the difference in level of the points of origin of the two pairs of horns. The anterior horns in many animals are merely bony excrescences capped by a horny wart, and their development is often much delayed, and in some cases seems to be altogether arrested. It is probable, therefore, that the anterior horns are in a state of atrophy. It has long been a moot question as to whether there are two distinct races, but having met with both types in the same jungle and after having collected and examined twenty-seven skulls, I came to the same conclusion as Blanford, namely, that there was no justification for this. Females carry no horns but possess four teats, and as one might expect two to three fawns are often born at a time. These appear in the cold weather. I have never observed them breeding. The period of gestation is stated to be six months, but I should doubt if it was as long as this.

Unlike other antelopes, but conforming to their African cousins, the chausingha is not gregarious, and is found singly or in pairs, the two fawns accompanying the parents until the rains. The country which they habitually frequent just enables them to see over the grass and they must constantly get separated. Their regular "rendezvous" is the heap where they deposit their dung, usually on a bare patch of trodden down grass, or sheet rock. Solitary animals lie up near

these places, and this practice is a further indication, referred to under nilgai, of the possible use of this peculiar habit.

Frequenting as they do country similar to that of deer rather than antelopes, they have developed some of the deer's habits. The necessity of developing a call or summons to get in touch with each other is felt—this does not arise with animals living where they can generally see each other. The buck, therefore, utters a loud shrill whistle not unlike a chital hind's and the female has a similar call of less volume. This call is regularly uttered by the bucks in the hot weather, and both sexes utter a somewhat similar cry of alarm. In addition, when galloping off from danger accompanied by her young, I have heard the mother utter a series of short sharp "bhaes," obviously to indicate the line of retreat which could not be otherwise known.

Like most deer, chausingha are also thirsty animals and drink daily, one of the favourite times being at mid-day. They possess only fair eyesight but have good ears and noses. When danger approaches they usually stand motionless, and the first intimation one has of their presence is when they gallop off, but as a rule they only go a short distance and then pull up and stare at the intruder, apparently trusting to the concealing grass which hides most of the body. Some, in my opinion, unnecessary emphasis has been laid on the liability of sportsmen to mistake the animal for the chinkara. Anything more dissimilar than the two animals in their appearance, habits, and environment can hardly be imagined, unless mere size is to constitute similarity. When hunted by dogs they show a fair turn of speed for a short distance only, and then attempt to escape by doubling and hiding.

Their food consists chiefly of dry grass mixed with

fruits of Aola and Ber berries (*Phyllanthus emblica* and *Zizyphus jujuba*), the flowers of Mohwa (*Bassia latifolia*) and a variety of buds ; in fact after the barking deer, they are the most dainty feeders in the jungle, and their venison is the finest the jungle produces.

Blanford states : " It is a shy animal and moves with a peculiar jerky action whether walking or running." Lydekker renders this as follows : " From their shyness these antelopes are difficult to approach ; when put up they start with a peculiar jerky run, which can never be mistaken ; this jerkiness also characterizing their walk."

What Blanford wrote is worthy of every respect ; at the same time it is necessary to state that the animal is not shy, and having seen them on many hundreds of occasions, I have never observed anything curious in their action. Animals which habitually gallop in long grass raise their fore legs and this gives them a plunging action, but there is nothing remarkable about this : it is the normal action of an animal galloping " blind." If this jerky action is an observed fact elsewhere, the reader will know that it is not a peculiarity of the animal in the Central Provinces.

The habits of, and the country frequented by the chausingha protect him from man, and the number killed by this agency is negligible. On the other hand, they are the frequent victims of the leopard, the wild-dog and occasionally of the tiger. They are never numerous in any given tract ; their solitary habits preclude this. At the same time, they are more numerous than is generally supposed, and an extensive jungle fire which destroys the cover and brings up a crop of fresh green grass often discloses an unsuspected number. It is probable that fire conservancy and therefore grass conservancy, is a great factor in their favour,

and that these conditions enable them to escape from their enemies more easily.

Four-horned antelope frequently come out in beats when the sportsman is intent on larger game. To search a large sea of grass for this little animal is rather like looking for a needle in a haystack. The sportsman is, therefore, advised to search the burned firelines near a grass area, as the chausinghia often comes out at dusk to nibble the young green grass which appears after the fire. It may be that in view of his camp there is a scarp of sheer rock capped by a few acres of yellow grass, this being backed further up by the forest, which finds insufficient soil on the spot where the grass grows. An area of this nature is circumscribed and it in most cases will contain four-horned antelope, in order to secure which the sportsman should make a careful search up wind.

CHAPTER XI

THE INDIAN PIG

In the minds of most sportsmen the mention of the word "pig" is associated with the word "stick-ing," and owing to the unrivalled sport afforded by pigs, the other aspects of the animal are apt to be overlooked. Nevertheless, few animals present a more interesting study from the sportsman-naturalist's point of view. And it is with this aspect of the pig that I chiefly wish to deal. Pig-sticking has been recently and adequately dealt with by Wardrop.

The Indian pig has an immense range, being found throughout India, Burmah and Ceylon, and also penetrating well into the Himalayas. Scientists have separated the European and Indian species on account of various differences, notably in the dentition, but have not yet determined where the dividing line between the two species is, and it is very probable that this may prove a matter of extreme difficulty. More light on the subject will probably result from the opening up of Persia and Mesopotamia.

My experience of European pig only extends to Bavaria and parts of Germany, and except such slight variations as one would expect from a colder climate and the conditions under which the European animal lives, the casual observer can distinguish no material difference between the two animals, certainly much less than that possessed by the inhabitants of these

two countries who, nevertheless, have not been classified as separate species.

Pig are found throughout the Central Provinces and are exceedingly common. They exist both inside the forest and in the plains. They are rare in the centre of unbroken stretches of forest unless an open maidan exists, and they require a certain modicum of cover in the plains. This modicum may merely consist of a grass "bir," or a few palm thickets or bush, or a series of alluvial "straightcut" nalas. After the rains have set in and during the cold weather, crops often supply all the requisite shelter. A *sine qua non* is a convenient water supply and without this pig are never found; in fact, I once insisted on the presence of water by meeting a sounder in the forest and discovered a pool which the local aborigines were not aware of, and which they assured me had only been scooped out during the preceding rains.

The appearance of the wild boar is well known. It is only necessary to state that they vary considerably in colour, some animals being grizzled, others dark slaty grey or brown, but the commonest colour is black. Lydekker states there is no "distinct whitish streak on the side of the face," which remark is not clearly understood as many animals have a grey or whitish tuft in the region of the chops. The young are brown and have longitudinal stripes which they retain for some time, and which may be either darker or lighter than the background, but the darker stripes are rare.

Occasionally an albino occurs. When out with the Nagpur Tent Club in the Wardha District, I once saw a white squealer, accompanying a sow which was attended by four or five normal youngsters. Some six or seven years after this in the same place a fair-

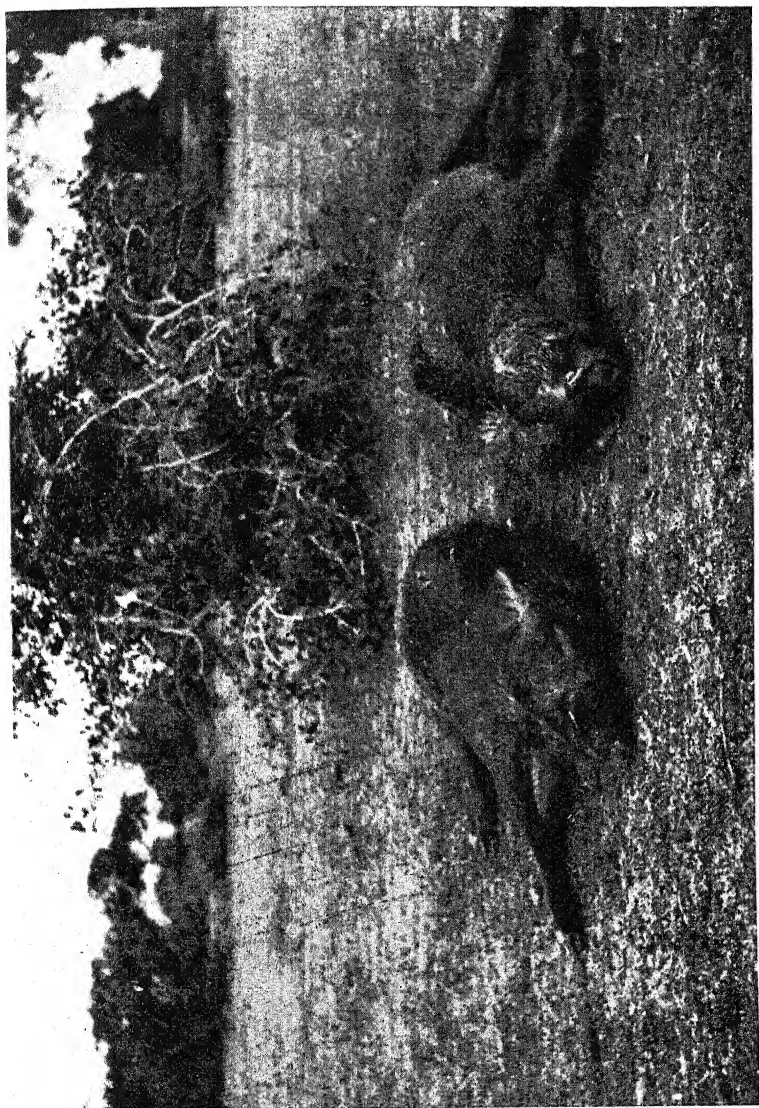
sized albino boar was hunted by Mr. Irwin, but owing to lack of support he was unable to kill it. No doubt if it is again seen and killed some notice of it will appear. Pig in the Central Provinces probably average considerably larger than elsewhere. In the Wardha country the killing of 300 lb. boar can be expected in any season, and on one occasion two boars of about 320 each were killed in the same sounder. The heaviest pig killed was 364 lb., and the tallest was 38 in. at the shoulder. Pigs of 280 lb. and 33 in. at the shoulder are common. The hunt limit is 26 in., measurements being taken between uprights with both feet together, the uprights being placed at the heel and the shoulder. The record of 409 pigs stuck during the last thirty years shows an average weight of 199 lb., and an average height of $30\frac{7}{8}$ in. During the same period 39 boars of 300 lb. or over were killed. Although the large number of pigs sometimes stuck in other parts of India cannot be equalled in the Central Provinces, both on account of the nature of the country hunted and the lack of pig in sufficient number, the Nagpur hunt is compensated by procuring the finest animals.

I have never seen these very large 320 lb. pig inside the jungle, nor do I believe that they exist there. They are almost a distinct variety and are exceedingly long in the back, much longer than the average boar and often have a sleek appearance. Jungle boars are more hirsute than the plains animals, and weight for weight are somewhat higher at the shoulder; they also tend to have better tusks. Tusks of 10 in. measured round the curve are occasionally got, but I have never seen them exceed $9\frac{1}{2}$ in. myself, and the finest set I know of as coming from the Central Provinces is a pair in my possession both of this length.

perfectly matched and of exceptional girth, being $2\frac{1}{2}$ in. round with this girth maintained to where the tip commences. These tusks belonged to a man-killer. I have stuck two animals of this nature, one in the Wardha District which appeared to be a normal animal, and the other in Hoshangabad which, however, had received many serious wounds at different times from man, quite justifying his retaliation. If anyone happened to pass this animal's lair he rushed out, and knocking them down ripped them to pieces; one corpse had forty-two gashes on it. When I rode him, however, he never even gave me a charge and he was a craven at heart.

Pig may be said to be omnivorous. They eat village crops, roots, tubers, insects, meat, snakes, offal and carrion. Both Blanford and Lydekker emphasize their addiction to grubbing in swampy places round tanks, and ascribe this to their love of the roots of the plants growing in such places, and this is so, but a great attraction also is the Mollusca and the innumerable insects, grubs and larvæ they find in such places. With regard to their eating meat, I have several times seen them devouring dead buffalo which had been killed by tiger, and I shall refer to this later in dealing with their intelligence.

As one sees "squealers" at all times, it is obvious that breeding is not strictly periodical; at the same time there are two seasons in which most of the young are born, namely, shortly before the rains, and again after they have ceased. I have never seen the rain's breeding, although I once disturbed a congregation of pig in the rains which I now know was a breeding assembly, but I have twice witnessed the spring rut. This commences about the end of March. These



TWO BOARS, NAGPUR COUNTRY.



are much more nocturnal where men are about, and have not the same facility for congregating. Various sounders which have been more or less in touch congregate round the "arena," in this case not a sandy level but a grass maidan in the forest. The master boars, of which I have counted as many as eleven, then fight.

One of the few additions of Lydekker to Blanford's work, is to the effect that old boars are never seen in a sounder; this will make all who are at all familiar with pig smile, as apart from the congregation to breed, some of the finest boars stuck have been flushed in company with sows. At the same time, old boars are often single, or in the company of an animal much about the same size. In describing the occasion to which I have referred, I cannot do better than quote from my diary:

"April 2. Saw an extraordinary sight. Heard curious clattering sound and pushed through long grass. Came on old abandoned fields and short grass. About 170 pig more or less in circle. Eleven large boars in centre. Two fighting: rest looking on. Two others evidently had already fought. Watched fight. Boars fencing with their tusks. Stood nose to nose and by sudden twist of the head and darts forward tried to cut each other on face and did so frequently. Desisted and then started again. Getting late. Shot three boars: fired at fourth." All the three boars killed had been badly cut about the face. The purport of this was no doubt a re-arrangement of the various sounders, and the master boar probably got the best harem. What struck me chiefly about the scene was the evident intention of all, except the two actually fighting, to remain passive spectators, and the absolute absence of brute strength in the combat,

this being replaced by fence and skill. On the other hand, I once saw a boar regularly charge another and the two animals stood up on their hind legs and used all the force they could. On this occasion sexual rivalry was not in question. How many times others have observed anything of the same nature I cannot say, but our ignorance of the ways and the thoughts of animals is ever present in me, and our knowledge is often merely limited to what is useful in killing the beast.

The period of gestation is stated to be four months. Four to six young are born. The mother makes a regular nest by tearing up long flag grass by the roots and arranging the grass in a large circular heap like a huge daisy with the thick ends inwards; she then burrows underneath and prises the whole mass upwards. It remains more or less in this position, and the family shelter therein. Failing a supply of grass, young bamboos are used, and as these when prised up retain their position owing to the side branches sticking in the ground, miniature huts are sometimes formed. The pig is an animal which has decided views about comfort, and a solitary old boar will scoop out a form to suit his convenience, and I have even known one make a shelter over his mid-day lair. I once saw a sow actually giving birth to her young beside one of these shelters which had been constructed beforehand, but the most remarkable thing was that a young boar of barely warrantable size (25 in.) assisted her. I have witnessed the same thing in the Indian tame pig which is almost the same animal and probably inter-breeds with the wild pig, as indicated by the striped "squealers" which one sometimes sees in villages.

In the bitter cold of a winter morning when the

grass is often covered with hoar frost or heavy dew, a sounder will lie huddled together, lying even on the top of each other for warmth. I have several times disturbed congregations of this nature.

The sense of smell in pigs is highly developed, but is somewhat akin to that possessed by the bear, and although not so "near scented" as this animal, pig more readily detect the trail of a man which has crossed their path, than a man concealed in a bush at some little distance. I have seen squealers which had become separated from the mother run her trail faultlessly at top speed. Their eyesight and hearing are moderate, and on several occasions I have been given the impression that an old boar was deaf.

Their general intelligence is very high, only slightly less than that of the bear; in fact, I have sometimes thought the pig was the more intelligent animal of the two, and his senses are certainly more highly developed. Like the bear, they procure their varied food in a number of different ways, and they have to know when various plants are in season and where these are procurable. Unlike the bear, their lives are associated with man, whose ways and habits have to be studied. When ridden, they often behave as if they were quite accustomed to this. They leave cover with a definite intention to make for some particular place, and when once they have finally abandoned their late holding ground, nothing as a rule will deter them from acting up to their convictions. The pig is a collected, self-possessed animal difficult to throw off his balance, and although he is subject to violent rage and indignation, this rage, unless wounded, is not blind rage: courage and rage must not be confused.

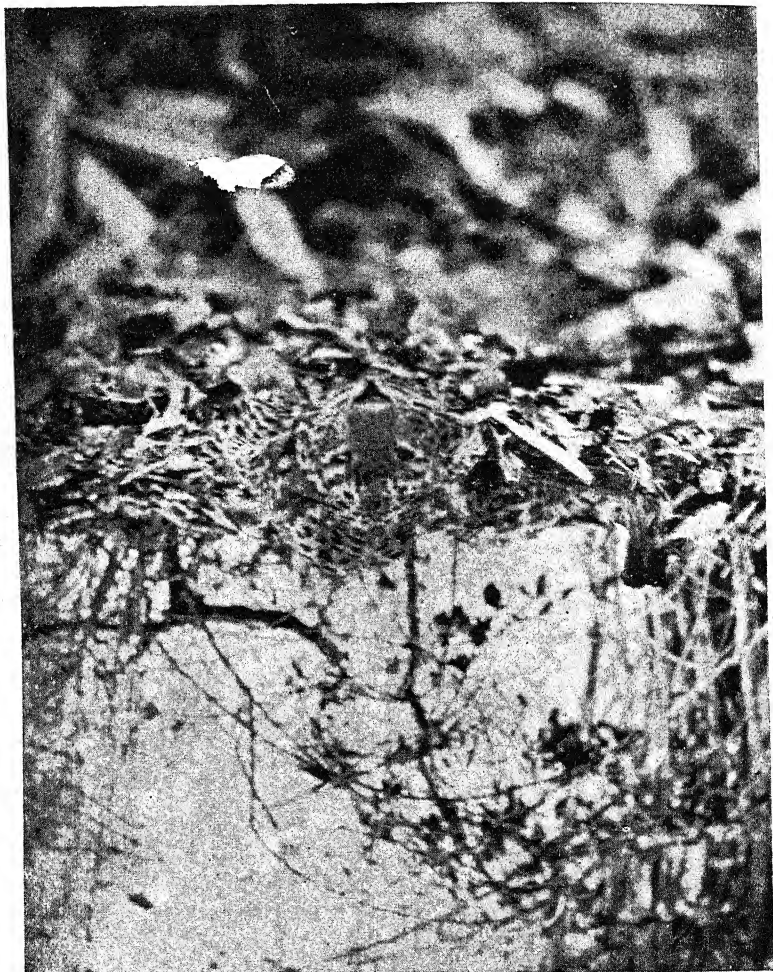
But it is in travelling to their new holding ground, that they display so much intelligence, as while keeping their general line they take advantage of every piece of cover or shape of ground that can give them any assistance. In fact, it is often a matter of the utmost difficulty for a single spear to come on terms with a boar which is following the course of even a small nala. Under these circumstances it is often the boar's courage which is his undoing, as he will refuse to be harassed beyond a certain distance and will turn round and charge.

I recollect on one occasion having hunted a very large boar up a wide dry watercourse in the Buldana district. I was alone. The banks were steep and I had no opportunity of spearing, but hung on in the hope of some more favourable ground turning up. For the tenth time at least I found myself on one bank and the boar on the other, opposite me. Quite 80 yards separated us when the boar slowed into a trot and uttering the two well-known grunts by which he declares war, he charged down his own bank and came straight for me and was speared.

Their courage, of course, is proverbial, and with one exception amongst all the animals of the jungle in this respect they are in a class by themselves. The animal which takes pride of place only does so by the allowance made for its diminutive size. They will charge home on an elephant, and on a solid unbroken body of men, not the charge of an animal wishing to break through an obstruction, but a definite attack not instigated by the idea of escape. During the shoot of His Royal Highness the Duke of Connaught, a boar charged an elephant in this way and fastened his tusk into her leg in the region of the chest. The gun on top had failed to stop the boar and the elephant then



A WOUNDED LEOPARD.



knelt down and crushed the life out of her plucky assailant.

I have known a wounded boar rise out of a pool and come thundering along the sandy river-bed straight at a massed body of hunters who had dismounted to finish him off. When they once start fighting, they fight it out. When actually being chased they will sometimes turn round and charge straight at one, meeting the horse as if engaged in a tilting match. The change in mentality which this implies indicates a very high degree of courage, and it shows that although the pig is running away he is not afraid. Their relations with tiger have already been touched upon. It is rare for anything but a large hungry tiger to attack a full-sized boar, and there are instances on record of the tiger having been worsted. I once saw a very large boar come trotting out of a beat alongside a full-sized male tiger, sharing the same path with him, and although the fact of their being hunted by man usually induces a temporary truce amongst animals, I know of no other creature which would have dared to share the path with a tiger.

Mention has been made of their eating a tiger's kill. I have seen this several times, but one occasion illustrates further intelligence on the part of the pig. I was sitting over a dead buffalo which was lying at the side of a jungle path inside a large forest. Three pigs came along, and becoming aware of the kill at some distance they made off, excepting one old sow which commenced circling round. There was some heavy cover close to the kill. Having carefully examined the ground, she approached from the open side and when fairly near the cover she suddenly bounded forward and uttering a startled grunt as suddenly

bounded back. This was repeated two or three times, and her obvious intention was to "draw" the tiger in the event of his being in the cover. Having satisfied herself on this point, she proceeded to eat the flesh on the neck, the entrails and the ribs, cracking these up and chewing with the usual contemplative deliberation habitual to pigs, and not bolting the meat in lumps after the manner of carnivoræ. While eating, she kept up a series of grunts and her little tail kept beating a continuous "tattoo" on her sides.

Pigs utter a variety of noises. The commonest is the usual grunting sound which they make when alarmed or disturbed. An animal separated from the sounder in cover will make a kind of "squeal" in order to draw attention and get in touch with the others. Boars when charging almost invariably announce their intention by two or three loud grunts—there is nothing underhand about the attack. The death cry is a prolonged scream which is often uttered, and it is a mistake to consider that this indicates that the beast was a craven at heart, as I have often heard it made by the most gallant boars. Another noise must be mentioned, and this is the curious clattering they make when champing or sharpening their tusks. The lower tusk is regularly ground against the upper, and if this becomes destroyed the lower tusk continues to grow to an abnormal length and may even seriously incommode the animal. Pigs at all times smell like pigs and their presence can often be detected. In addition, the boar, when wounded or annoyed, has the power of emitting a most powerful pungent musky smell which comes from the small sac at the end of the sheath.

The glories of pig-sticking have often been sung

by abler pens than mine, and I can only add my quota to what already has been said. Nevertheless, there is one aspect of pig-sticking which has been overlooked. If asked what I considered to be the finest sport in the world, having taken part in most, I would unhesitatingly put pig-sticking in a class by itself, and then discuss which of the other sports is entitled to pride of place. The love of field sports is an inheritance from primitive man who hunted from necessity. Pig-sticking takes one further back and more nearly approaches the primitive stage of hunting than any other sport, and the essence of its fascination lies in this fact. The same principle applies to fox-hunting, but the introduction of the dog as an assistant to man took place at a later stage in man's development. In both sports the horse is an essential, but in hunting, the chief pleasure apart from riding straight and well, is in watching the hounds work, and the success of the hunt chiefly depends on them. In pig-sticking the man is the hunter himself, and he has to kill the boar with his own right arm. In shooting, the bullet does the actual killing, but in pig-sticking one is hound and bullet combined. The fierce straining after a large boar when all consciousness is lost except the desire to lessen the intervening space, followed by the fierce rush of the charging boar, which is met "with equal lust and greater thrust," has nothing to equal it. The crash of the spear into his bristled back seems to communicate itself up the shaft and through the arm into one's very being and one becomes for the time being "primitive man."

This atavism no doubt accounts for a certain shortness in temper which often develops after a run. Keen rivalry for first spear is also present in this sport, but the tradition of the Club to which I had the honour

to belong was to ride so as to "kill the boar," and riding for any other object was discouraged. The best country hunted by the Nagpur Tent Club lies in the Wardha district in the vicinity of Hinganghat. Here pig in greatest numbers and of the largest size are found in rideable country.

The country consists of a series of nalas along which Sindi or toddy palms grow. These are in all stages of development, and when young and bushy supply the necessary cover. The areas between the nalas are often cultivated ground, cotton, tur and jowar being the commonest crops.

The method of hunting is to beat up the nalas with a party of horsemen on each side and slightly in advance of the beaters. The pig either break across the open to another nala or continue up the same nala, which often thins out and admits of their being hunted. Previous to commencing the beat, the trees surrounding the cover are manned by flagmen whose duty it is to wave the flag when a pig breaks and to continue to do so indicating the direction it has taken. The sun is often hot and no doubt the perch is sometimes uncomfortable, and these men occasionally tie the pole bearing the flag to the tree and descend for a smoke and a rest. When pig escape in this way, even those who are slow to wrath can be exasperated, and I have seen that well-known sportsman, Mr. W. B. Starky, under whose captaincy I have so often hunted, showing some slight irritation on these occasions.

My advice to the novice is, as soon the word "ride" has been given by the captain of the side, to ride straight at the boar as hard as he can and to continue to do this. In other words, to "ride the pig." Persons who imagine they have divined the boar's inten-

tions and, ride cunning seldom do much with their spears. Even if the ground admits of one going all out, it is astonishing how the pig holds the horse for the first four or five hundred yards; but after this, if one can still press him, he soon comes back to the horse. A certain amount of judgment now comes into play: if fresh holding ground is near at hand the pig must be pressed to the utmost, as even a slight wound may induce him to turn and fight. In pressing him thus he is very liable to jink, thus letting in another spear. But this does not matter, one is out to kill the pig. If, however, space permits, the man in "possession" should hold the pig, keeping it a few yards in advance for a short distance and then, letting his horse all out, come in with a rush which overtakes the pig before he has time to jink and admits of a heavy spear being delivered. Large heavy pig usually give only moderate runs, the best sport is often afforded by animals of 30 in. to 32 in. at the shoulder and weighing about 220 lb. to 260 lb. These animals are active enough to stretch the horse, can charge with great speed, and are bulky enough to come home unless held off by a well-planted spear.

Officers like myself, who lead solitary lives in camp, often have opportunities of riding pig in some particular spot where the ground admits of this being done. I have killed pig in the Mandla, Chanda, Hoshangabad, Khandwa and Buldana districts. In the latter district I found a spot on the Mekar plateau where owing to a recent year of drought all cover in the nature of holding ground had died down. The pig, however, had remained on, but they had no refuge to which they could run and provided one could find them they could not escape. I once killed five large boar in this country during the course of the morning's work.

When pig-sticking alone in this way, the element of rivalry is absent and one can in consequence pick one's own place for delivering the initial spear; also, as one never knows what may happen, it is advisable to have some other weapon attached to one's person. I always carried a large powerful hunting knife in my belt, which would both stab and cut. It was made to special order by Wilkinson, Pall Mall, and is still as good as the day it went to India twenty-three years ago. This knife weighs 2 lb. and has a blade of 12 in., double edged for 4 in. at the top and with a slight curve in the face of the cutting edge; it still goes through a penny like a piece of cheese.

I have been glad of this weapon on several occasions, especially so on one, in which a wounded boar sprang on my horse's neck as I was mounting a steep bank, and in spite of being speared got the pommel of the saddle into his teeth and we all rolled down to the bottom of the nala in a confused mass.

Another precaution when pig-sticking alone is to get a special spear head with a specially large socket so as to admit a stouter bamboo. It is most annoying to lose a fine boar by breaking one's spear. When hunting in company, a break is of less importance. The shafts supplied from Calcutta often break like carrots, and I always found that the indigenous male bamboo (*Dendrocalamus strictus*) of the Province possesses double the strength of those usually supplied. There is one favourite spear which I have had in frequent use since 1910, and beyond a few dents where a bear bit it, the shaft is still as good as the day it was put in.

Some of the country, especially in parts of Hoshangabad, contains no well-defined holding ground which can be beaten. Pigs in such places often lie up in

Ber (*Zizyphus jujuba*) bushes which are scattered about the boundaries between the different fields. The best plan in country of this nature is to offer a reward of Rs.5 to anyone showing a bush containing a boar. The men go out in couples at daylight and watching the pig before they have lain up for the day mark them down into their resting-place. One man remains on guard in case they shift and also to prevent their being disturbed. The other returns to camp. When all have returned the day's arrangements can be decided upon and each place visited in turn. This method has the advantage of being cheap and expeditious as no time is lost.

As already stated, this chapter does not purport to be a treatise on pig-sticking, and the subject has only been lightly touched upon, but a few words of warning to the novice may be added with regard to the danger of careless handling of a spear. I have seen nasty accidents in consequence, and on one memorable day two horses were speared by faulty handling. I would as soon have a loaded gun pointed at me as a hog spear, and the point should never be carried so as to admit of any danger to one's neighbours in the event of a horse shying or stumbling.

The attention of the beginner is also invited to the "Maxims for the Novice," which run as follows :

"1. Never send out a chair of your own. Appropriate the chair of another member, and give him the privilege of sitting on a box. He will enjoy it.

"2. Never take out ropes with which to tie up your horses. Send your syce to cut some off the Hunt tents. There are too many ropes on the tents, and members may not have the pleasure of seeing them blow away on a windy day.

"3. If you have a kicking horse, be sure that you post

him in a narrow lane along which members are likely to pass, so that he may have a good opportunity of practising his favourite pastime.

"4. When riding in a heat, keep close on the heels of any horse in front of you, and carry your spear point on a level with its rider's head. This reduces the chance of a blank day.

"5. When a boar breaks cover, ride him at once as hard as you can, regardless of the remarks of the other members. This gives the boar an excellent chance of breaking back and being lost. If you cannot do this, hang far behind the leader of the heat when a boar is being nursed away. Then, when the order to 'ride' is given, you will be well left and have an excellent grouse.

"6. At table, and in camp generally, warn your servant that he is to attend you and you only. Some foolish member may have allowed his servant to assist in the kitchen and other work: he does not deserve to get any food, drink, or baths."

Pigs are much shot at by natives and hunted by special tribes with dogs and snares, amongst whom the Pardis may be mentioned. The dogs they use are trained to point a bush containing a pig, and when this has been surrounded the pigs are started and anything of moderate size is seized by the dogs and at once clubbed or speared. They also snare pig with snares made from sinews. In chasing a pig, I once galloped into one of these just as I was getting on terms with a boar and took a most infernal toss, and the snare actually held the mare until the root it was attached to gave way.

I have never, after my first experience, attempted to lay on dogs of any courage to a boar, as they simply get cut to pieces. In addition to man, pigs are preyed

uppon by tiger, leopard, crocodiles and wild-dogs, but they often inhabit country where they have no natural enemies except man, and they still persist in far larger numbers than the cultivator and the agricultural department consider desirable.

CHAPTER XII

OTHER JUNGLE ANIMALS

The ways and characteristics of the more important animals of the Central Provinces have now been described at some length, but there still remain a large number of other animals of interest to the sportsman and the naturalist. To deal with these in detail would unduly increase the size of this work and would also depart from its object as stated in the Preface. These animals are, therefore, only dealt with in a cursory manner and much that might be said concerning them has been omitted. I have endeavoured to confine my remarks to matters of special interest and to draw attention to certain characteristics and habits which have hitherto not been observed or referred to by previous authors.

Apart from determining what to say and what to omit, the difficulty of selecting certain animals arises. It is clearly impossible to deal with all that come under one's notice. I have, therefore, only dealt with those animals which appear to me to be more likely to interest the average sportsman on a shooting trip in the Central Provinces. All mention of bats and rats is, therefore, omitted, and in some of the other orders only certain species are referred to.

PRIMATES

The Province only contains two monkeys, *Macacus rhesus*—the Bengal Monkey—and *Semno-pithecus*

entellus—the Langoor. It is possible that a third species may occasionally be found in the extreme south of the Province, namely, *Macacus sinicus*—the Bonnet Monkey—and sportsmen might add to the knowledge of this animal's distribution by observing the monkeys in these parts.

The Bengal monkey is found locally throughout the Province at certain villages, generally those in the vicinity of an old fort. It is not nearly so commonly or generally distributed as the langoor. The Bengal monkey is the moderate-sized brown monkey with a short tail and the red hindquarters commonly seen stalking around or squatting in a mango tope. It is altogether a mischievous, unlovely and unlovable animal of little interest to the sportsman. They are hardly ever found living inside the forest unless an old ruined fort exists. I have only known one exception to this; on the other hand, they are commonly found in such places. They are sometimes seen frequenting cliffs.

The Forests of the Central Provinces contain many ruined forts of which all tradition is lost, and which have been in this state for hundreds of years as evidenced by the size of the trees now growing on them. The monkeys now found in such places are no doubt the descendants of those which existed there when the fort was occupied; when this was abandoned the monkeys remained on and still persist. Fear or lack of enterprise prevented them from trekking through the surrounding jungle to more congenial surroundings, and their persistence has been no doubt assisted by the presence of fruit trees such as guava and custard apple, descendants of those originally planted. The persistence of fruit trees is remarkable, and it may be of interest to mention that the vines or their descendants

planted by the Emperor Aurungzib at Azirgarh Fort still exist under jungle conditions and still produce excellent grapes. These vines are stated to have been planted by Aurungzib when he was Viceroy of the Deccan and had his court at the neighbouring city of Burhanpur, and it is certainly unlikely that they were introduced by anyone else subsequent to his departure.

The Bengal monkey takes readily to water, and I once saw a solitary old male take a header into a jungle stream from a height of twenty feet and swim a pool, using the breast stroke hand over hand. He was quite qualified to enter for a school competition.

In contrast to the Bengal monkey, the langoor is a large handsome monkey with a fine long tail and a beautiful grey or greyish brown coat, black face and hands. In some specimens the hair in the groin and armpits is reddish yellow. This monkey is found in villages and round shrines, but is also a common jungle animal, and will be met with in the remotest spots provided there is a water supply. A troupe usually consists of ten to twenty animals under the leadership of an old male who also acts as the forward scout in cases of danger. These monkeys are a great aid to the sportsman and they can be looked upon as one of the great "advertisers" of the jungle, and hardly ever permit a tiger or a leopard to pass without emphasizing its presence.

They make two different noises when doing this, both very difficult to describe. One is not unlike the sound a coachman makes to urge on or start the horses; and the other resembles a series of hiccups. They will also make these sounds at bears, wild-dogs, elephants and man, but with much less vociferation, which a little experience soon distinguishes, just as the timbre of

the bark of a dog when confronting a dangerous animal is easily recognized. They have considerable intelligence and remarkable powers of recognition, and will scream furiously at a leopard or tiger skin being borne along by men or flapping in the wind, venting their annoyance on their enemies' remains. These monkeys possess two more calls—one is a grunt not often heard, and the other is the loud "whoop whoop," which is one of the first sounds heard in the jungle in the morning. The noise is also commonly uttered shortly before they turn in for the night. Preparatory to this they frequently bound about from branch to branch and then suddenly cease, and all is quiet; forcibly reminding one of analogous behaviour often seen in the nursery.

The monkeys and the squirrels, with the exception of the flying squirrel, are the only truly diurnal animals found in the jungle. Langoors are extraordinarily active and often cover immense gaps by bounding from one branch of a tree to another. In doing this they are well aware of the value of using the branch they take off from as a spring-board. They have a wonderful speed for a considerable distance and can easily beat anything but a fast dog. When tackled by dogs they fight viciously, but often in a misdirected manner, as their own habit of fighting is to attempt to seize the other monkey's fingers. On the other hand, given the opportunity, they will attack a small terrier and bite it in the neck and body, sometimes fatally.

Their food chiefly consists of fruits, berries, buds and leaves, but they are also most destructive of crops, and at times in particular places rewards for their destruction are offered. I once shot a large male at the request of the villagers as it had molested a young girl.

One, occasionally two, young are born at a time, during no particular season. The mother carries the young attached to the breast and in galloping over the roughest ground gauges the necessary clearance to an inch.

I once came on an old shrine to the Goddess Kali situated in the heart of the forest. It was tenanted by an old priest and his "chela." The old man had lived there nearly all his life, having been "chela" to the previous priest. He had completely tamed a very large troupe of jungle monkeys and these were called up from the forest for my entertainment. I spent several hours with him. He knew more about langoors than anyone I have ever met. Many of the monkeys were known by specific names which they recognized. The marked difference in the expression of the eyes and countenance indicated strong differences in character, and the more intelligent and tractable animals could be easily recognized. The troupe was led by a very large old male who did not hesitate to rob his wives of any food they had secured, but on attempting this on a baby he was at once set upon by half a dozen females and had to desist, thus forcibly reminding one of "slum law." The old priest indicated a promising male, which he stated would fight and oust the present leader in three or four years' time. According to the priest, the leader holds his position for ten to twelve years, and on losing this he is driven out of the troupe and has to lead a solitary life under which conditions he soon falls a victim to a leopard or tiger.

Young tigers occasionally kill monkeys, crocodiles and leopards consistently do; in addition, monkeys constantly die from natural causes. I have often found their corpses, and disease chiefly accounts for their numbers being kept within reasonable bounds.

CARNIVORA

The appearance of the Hyena (*Hyaena striata*) with his striped body, maned neck and back, high withers and low quarters, is well known. A good-sized bitch weighs 75 lb. and a dog about 10 lb. more. Hyenas are found throughout the Province but are somewhat more common in the western zone. They generally live in pairs; when a single animal is met with it is usually owing to a temporary separation. They may be encountered anywhere but are most frequently found in a nala in the plains, or in the outskirts of the forest adjoining the plain. They regularly inhabit enlarged porcupines' earths, caves, and crevices between piles of boulders. Their young, three or four in number, are born in these places usually in the hot weather. I have seen them breeding in the cold weather. Their habits are the same as those of domestic dogs.

Their food chiefly consists of carrion; they are one of the great scavengers, cleaning up the jungle after the greater carnivoræ. Nevertheless, I have known them frequently to kill goats, sheep, dogs, calves and all young and helpless beasts, and it is only their cowardice which prevents them killing larger animals, as their strength certainly permits of their overcoming these. Their cowardice is the more remarkable in view of their attitude towards leopards which has been described under that chapter.

In finding their carrion they display marvellous powers of smelling. On the other hand, their eyesight is not remarkable and their powers of hearing only moderate. Occasionally five or six are found together, but this is rare. Although such filthy feeders, they are more punctilious than the vulture, as I have never known them to eat one of their own species, or a dead

vulture, although on several occasions, they had opportunities of doing so.

They afford no sport unless they can be hunted with dogs or ridden. When tackled by dogs and held beyond hope of escape, they will sham dead and endure the most dreadful worrying without protest until the dogs desist. On several occasions I myself have been completely deceived and have only discovered that the hyena was very much alive on putting a spear into it, when the animal, conscious that it could not endure this and survive, jumped up and attempted to escape. I have only once known one charge and this was when riding to hounds without a spear. The hyena, pursued by the dogs, found me in its way and snapped viciously at my foot which was saved by the stirrup. When ridden without dogs hyenas give an excellent run, as they never let themselves "all out" and always have a little extra pace left in them just as one closes to spear, which enables them to jink.

They often make the most extraordinary noises; the commonest is a sort of chattering laugh, and the other is a weird form of howling. Natives are often unobservant as regards detail and the young sportsman may be induced to confuse a hyena's spoor with a leopard's, although the two pug marks are entirely different to anyone with experience. There is one infallible and easy test—the hyena, as well as all the dogs, leave the imprint of the claw, whereas the cats, with the exception of the cheetah, do not; further, the relative size of the fore and hind feet in the hyena is very marked, the latter being small, and this test at once distinguishes their spoor from that of the tame dog. Hyenas are highly intelligent animals, are easily tamed, have an affectionate nature and make excellent pets.

The Indian Wolf (*Canis pallipes*) lives in open scrub and plains. Its habitat is, therefore, outside the areas in which the Forest Officer usually camps. I have only seen wolves in the Central Provinces on three different occasions, one in Berar, one in Seoni, and one in Hoshangabad. This animal is now exceedingly rare in the Province; even those who habitually camp where wolves might be expected very rarely see them. In the middle of the last century they were fairly common, and as there is no apparent or material change in present conditions, their decrease in numbers is inexplicable. Being so rare an animal of the Province, it is unnecessary to enter into any details regarding its habits and life history.

The Jackal (*Canis aureus*) is so common and so well known, a detailed description of its appearance is unnecessary. Moreover, this presents some difficulty as both the size and colouration may vary very greatly. Red jackals, and grey jackals, and bluish-slate coloured jackals are often seen, the latter more frequently in jungle tracts. Jackals chiefly consort in pairs and live round villages, which they visit at night to pick up anything they can find in the way of food. They are great scavengers but will kill and eat anything they can master. In the forest they sometimes collect into packs and hunt small deer and antelope much as wild-dogs do. I once saw a pack of ten or a dozen animals in full cry after a four-horned antelope, and I have no doubt they would have easily pulled it down as they have excellent noses. Jackals also eat numbers of different kinds of fruit, one of the commonest being the small plums produced by the Ber tree (*Zizyphus jujuba*). They also eat lizards and insects. They afford excellent sport when hunted with dogs, and like the hyena sham dead when caught. They seem

to breed at all times, but I have more often observed this in March than at other seasons. The cubs, three or four in number, are deposited in an earth or drain.

The peculiar cry of the jackal called "pheal" and their relations towards tiger have already been described. Their common cry is a long wailing howl repeated on a higher scale three or four times and ending up with three yelps. They commonly make this noise shortly after dark and again before dawn. In the still of the early morning, an hour before daylight, I have often heard this sound approaching from a distance to be caught up by those around the camp, and passed on to others, until the cry fades away in the distance, and I believe this early morning howl passes right across India from Bombay to Calcutta.

The Indian Fox (*Vulpes bengalensis*) is a beautiful little animal and is common throughout the Province, but is seldom found inside the forest and is scarce in the black soil of the Plains of Berar, where suitable soil for burrows and breeding do not exist. Elsewhere its chattering bark can be heard on most evenings. The Indian fox lives chiefly on small mammals, birds, lizards, insects and fruit. In catching birds, insects, etc., its behaviour is cat-like and it pounces on these. Its remarkable speed seems to have been developed for self-protection rather than hunting as I have never seen them course a hare. For their size (6 to 7 lb.), their activity is astonishing, and although greyhounds will rapidly overtake them, it is often a long time before they succeed in killing, as the fox dodges and twists like lightning, gaining yards at each turn. I have even seen the dogs run to a standstill. In thus dodging, the tail enters into play and is turned to one side or another and seems to act as a rudder.

Out of a number of wild-cats found in the Province, by far the most common is *Felis chaus*, the Jungle Cat. This animal may be found anywhere—in the heart of a dense forest or in a grass patch in the open plains. It varies greatly both in size and appearance. I have weighed mature animals which scaled 9 lb. and others have been as much as 20 lb. The colour may be sandy grey or tawny red ; some specimens are without markings except on the tail ; in others the limbs may have transverse markings and the body may be marked vertically with rows of spots or wavy lines. This cat is a savage intractable animal, and as it kills an immense amount of game should be destroyed whenever possible. Its chief food consists of birds and small mammals. It is especially destructive to game birds, most of which it kills and I have even known it to kill peafowl.

The Caracal (*Felis caracal*), so commonly misnamed the lynx, is a cat of an entirely different character, being easily tamed, when it becomes very friendly and is a most interesting pet. Unfortunately, the animal is rare and one seldom comes across them. They stand high on the leg and do not walk in a crouching manner, thus reminding one of the gait of the hunting leopard. A good specimen measures 18 in. at the shoulder. The usual colour is a rufous fawn, but a bluish tinge is often present which produces a blue roan effect. In catching birds they are adepts and show wonderful agility. They will also kill small goats, hares and gazelles.

The Hunting Leopard (*Cynælurus jubatus*) has now almost entirely disappeared from the Province without apparent reason, and I only know of three animals having been procured in the last twenty years. In territories outside the Province, especially to the north, they are commoner. Rumours of their existence in

parts of Berar, the Seoni Plateau, and Saugar, still persist, and it is possible that one or two may still persist. Other cats which are found in the Province are the Indian Desert Cat (*F. ornata*). The Fishing Cat (*F. viverrina*) is also found, but rarely. This is an immense powerful cat built on the lines of a miniature jaguar weighing as much as 21 lb.

The Province contains three civets, namely (*Viverra zibetha*) the Large Indian Civet, an exceedingly rare animal found in the extreme east of the Province, but I once saw one at Pachmarhi which gives rise to the speculation that its distribution westwards may have some connection with Sandstone formation or Sal Forest; the Palm Civet (*Paradoxurus niger*) is also rare, but I have killed it on several occasions; the Small Indian Civet (*Viverricula malaccensis*) is common but is not often seen, and unless one is trapping small mammals its presence in a particular locality escapes notice. They will live in villages and also inside large forests. In appearance this civet gives one the impression of being half fox, half weasel. The following are the dimensions of an average male:

Length of body.	.	.	.	.	1 ft. 9 in.
Length of tail .	.	.	.	.	1 ft. 3 in.
Height .	.	.	.	.	8 in.
Weight .	.	.	.	.	5 lb. 2 oz.

When met with in the forest, this little animal often creates more excitement than his size justifies, as an elephant appears to be unable to distinguish its smell from that of the tiger.

Two Mongoosees are found in the Province (*Herpestes mungo* and *Herpestes smithi*). These two animals have the same habits, and although some specimens are easily recognizable others seem to be intermediate between the two and are difficult to classify.

H. mungo is much the commonest. These animals are easily tamed and make splendid pets. Their food chiefly consists of small mammals, birds and reptiles. It is curious to see them handle an egg. This they will break by scooping it backwards with their fore feet so as to drop it on a stone and thus break it. They are abnormally inquisitive animals. I was once associated with one belonging to a friend in camp. If one did not know exactly where it was one had only to put some peculiar object such as a bunch of keys on the tent floor when within a minute the mungoose would be seen examining it.

On one occasion this animal discovered a newly opened tin of cigarettes, and not content with examining one, it pulled out every single cigarette in turn. On arrival in a new camp its first proceeding was to examine each and every crevice or gap beneath the tent wall through which it would squeeze, and then repeat the process at the run, testing in fact the pace at which the gap could be taken. No doubt detailed knowledge of local geography is often necessary in order to escape their enemies.

A great deal could be written about the mungoose, but space forbids more than a short reference to their behaviour with a cobra. This is not consistent, as I have often seen them refuse to tackle it, but sometimes they will do so. The mungoose avoids being bitten by his agility. When a snake strikes, his head, which is raised, is darted forwards and downwards so as to bring the head on to the ground. From this position, they cannot again strike until they have recovered themselves and for a fraction of a second the animal is defenceless. The mungoose seizes this opportunity to catch the snake by the back of the head.

The Indian Batel (*Mellivora indica*) although a

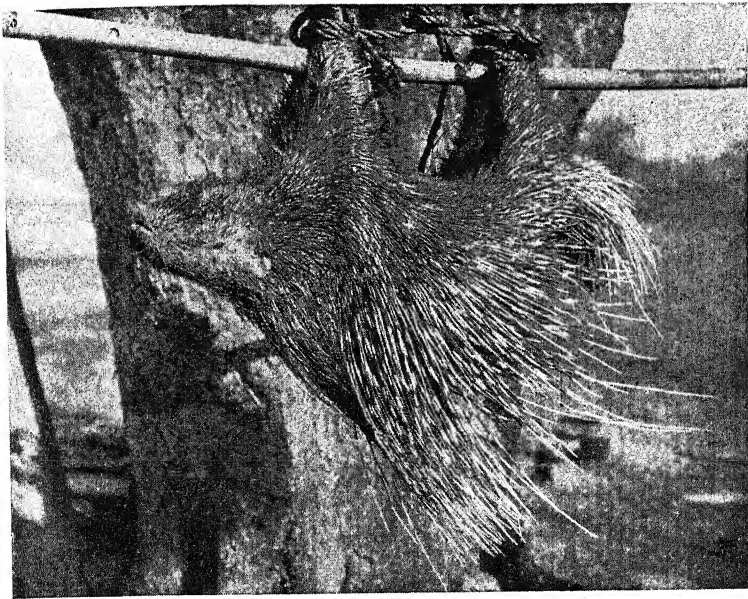
fairly common animal owing to his being exclusively nocturnal, is seldom seen and very little is known about his habits. I once saw one come out in a beat, but have frequently discovered them through my dogs, as although they usually lie up in an earth, they will also sleep in a thick bush or under a clump of fallen bamboos. In shape and in his action the ratel resembles a miniature bear. The under surface of the body and well up the ribs is black. A broad sharply defined silver grey band runs from the face almost to the tip of the tail. I have no doubt this peculiar colouration is the result of his nocturnal habits and is protective in bright moonlight. The feet, especially the fore paws, are armed with powerful claws similar to those of a bear.

The following are the dimensions of a large male and a moderate-sized female :

Length of body	.	.	.	.	.	29 in.
Length of tail	.	.	.	.	.	6 in.
Height	.	.	.	.	.	12 in.
Girth of head	.	.	.	.	.	13 in.
Girth of neck	.	.	.	.	.	12 in.
Weight	.	.	.	.	.	23 lb.

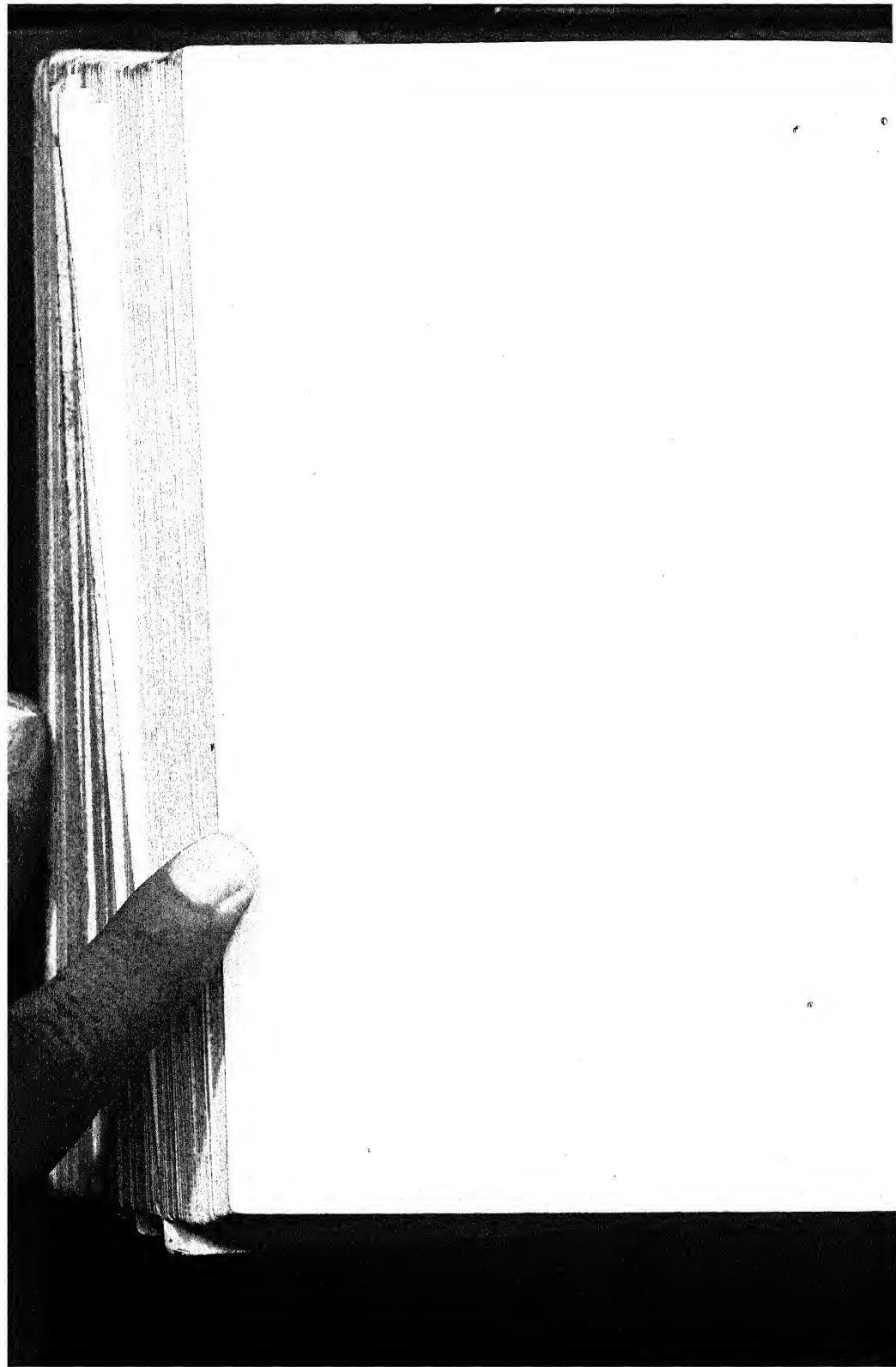
Length of body	.	.	.	.	.	25 in.
Length of tail	.	.	.	.	.	7 in.
Height	.	.	.	.	.	11 in.
Weight	.	.	.	.	.	17 lb.

These animals usually live in pairs. They issue out of their earths after dark in quest of food and can sometimes be seen in the moonlight scraping holes in the sandy beds of rivers. The sportsman who observes these excavations may sometimes wonder what animal has made them. In proceeding along the river-bed they frequently indulge in gambols and will roll head over heels, they seem to be merry little animals.



PORCUPINE.





Their food, consists of small mammals, birds, small reptiles, insects and a large variety of fruits and vegetables. They also eat carrion, and one of their names, "The grave digger," is thoroughly earned as I have known them exhume a corpse. I once had to give evidence regarding this habit of the ratel in a murder trial, the defence relying on the exposed human remains being those of a corpse removed from an adjoining grave.

The Indian ratel, like the bear, can also climb trees. When tackled by dogs, they put up the most extraordinary fight and seem to be made of indiarubber, so long is it before the dogs can make any impression on them. Considering their size, they are endowed with a courage possessed by no other animal and they would appear to be greatly attached to each other. On one occasion at dusk my pack tackled a ratel in a bush at the foot of a hill. During the fight it uttered a number of screams not unlike those made by a baby bear. Engrossed in watching the fight I was nearly seized by its mate which had descended the hill and come to the rescue. This animal continued the attack which I avoided by leaping until I put an end to its activities with a large hunting knife. A very similar scene once took place when I was accompanied by a friend armed with a hog spear.

The large male, whose dimensions are given, was disturbed in a bush during the day-time by a coolie, and rushing out seized him by the calf of the leg and inflicted a very severe bite. When they realize that to fight is useless, like many other animals, they sham dead.

We must now leave this most interesting animal and pass on to the Otter (*Lutra vulgaris*), of which genus I have never been able to distinguish more than one

species in the Central Provinces. This animal is found locally in all the main rivers and larger jungle streams. In appearance they exactly resemble the European otter, but are somewhat less heavily coated. A large male weighs 22 lb. Two to five animals are often seen together, but occasionally regular schools are met with. I once counted 22 otters in one pool. When fishing they co-operate and forming a semicircle drive the fish on to a shoal. Their food is not by any means confined to fish, and when the pools shrink in the hot weather I have known them to inhabit an earth on the hill-side and take to jungle hunting like other carnivoræ. They are by no means helpless on land, and a tame otter possessed by Col. Chapman, I.M.S., used to accompany the "bobbery" pack after jackal. The only cry I have ever heard them utter is a shrill yap.

RODENTIA

Three squirrels are found in the Province. Blanford in his *Mammalia* apparently with some reluctance classified the Jungle Striped Squirrel (*Sciurus tristriatus*) as a separate species, thus distinguishing it from the Palm Squirrel (*Sciurus palmarum*). As I have so often seen animals which by outward appearance it was impossible to classify, I prefer to leave the onus of defining the distinction to the systematist. Personally, I believe they are merely varieties of the same animal. Some emphasis has been laid on the difference in the twittering uttered by the two animals. This is certainly true, and jungle animals make a different noise from that commonly uttered by the village squirrel. This, however, is not consistently so; moreover, this difference would in itself not justify the creation of a separate species. It is pertinent to mention that the

cawing of the common Indian crow is quite different if uttered by Central Indian or Himalayan bird.

The palm squirrel is one of the commonest animals in India and is found chiefly in villages and on roadside trees, but is also scattered throughout the jungle. They are one of the few diurnal animals found in the forest. Their behaviour is sometimes useful to the hunter as they will indicate the approach of a tiger or leopard, and if these animals happen to squat before coming up to the gun they continue to demonstrate and indicate their position.

The palm squirrel must not be confused with the Madras Tree Shrew (*Tupaia ellioti*), which little animal runs about and behaves exactly like a squirrel even to the management of his tail. It can be recognized by its more uniform colour, and moreover, belonging to the order Insectivora its dentition is entirely different from a rodent's. This little Insectivor is found throughout the Province, but I have rarely seen it on black cotton soil, trap and volcanic formation, and it evidently prefers the conditions resulting from a sandstone or crystalline formation.

The large Indian Squirrel (*Sciurus indicus*) is also a diurnal animal and only occurs inside the forest. It is not common in the Central Provinces and its distribution is most peculiar. I have seen it sporadically in the Sal Forests in the eastern portion of the Province, and is stated to be commoner near Amakantak and in Allapilli. It occurs in the Sal Forests around Pachmarhi and there are several colonies in the Bori Forest below the Mahadeo Hills. In fact, this is the only place I know where one could go with certainty and at once procure a specimen. I have never seen it or its nests in any forest situated inside the volcanic formations, and this is the more surprising as the

Melghat, which is not far from Bori and which contains jungle of a very similar type, does not harbour this squirrel, although the Flying squirrel is common.

The large Indian squirrel is a beautiful animal with almost every shade of chestnut and brown found on some part of its body.

The following are the average of a number of measurements (the two sexes are of equal size) :

Length of body.	.	.	.	.	15 in.
Length of tail	.	.	.	.	16 in.
"	"	including the hair	.	.	18 in.
Weight	.	.	.	.	2 lb. 13 oz.

These measurements and weights differ very considerably from those given by Blanford, who does not state from what part of India the specimens which were measured came.

Their food consists of the usual nuts and fruits eaten by most squirrels. They build large nests at the top of trees, made of sticks, leaves, and branches bound together loosely by fibre.

The Flying Squirrel (*Pteromys oral*) is much more generally distributed than the last species, but is particularly common in the Melghat and parts of Chanda. I have seen it in a number of districts, including the forests of the Nimar District north of the Nerbudda, but it is rare in the east of the Province and avoids Sal Forest. The specimens I have examined approach in type to the Bombay variety as mentioned by Sterndale, the general colouration being grey, speckled with brown or black. The weights and dimensions of the Central Provinces animal are considerably less than those given by Blanford.

This squirrel is entirely nocturnal and spends the day asleep in a hole. Their position when doing this is peculiar as they curl up in a ball with the crown

of the head resting on the floor. The head is thus upside down and the nose is close to the root of the tail.

In consequence of this habit, the top of the head is quite flat. When in this position, the loose skin partly enfolds the body, but when running about it contracts like rubber and is no sort of hindrance to this very active animal. In taking off from a branch, they launch themselves with a spring and then spread out the four limbs and the attached skin. When viewed from underneath, they resemble a slate flying through the air. I have seen them make very long flights right across a river. They ascend a few feet so as to almost "stall" before alighting, and they achieve this in the lightest and most noiseless manner. They make a curious "booming" call when they emerge from their holes after dark. The noise can easily be confused with that of an owl or some night bird, as it more resembles the call of some bird than that of a mammal.

I once kept one as a pet and like the great Indian squirrel it was very easily tamed, but it was delicate and died of a surfeit of beetroot. Their food is similar to that of most species, but they also regularly bark certain trees, notably Albizzias. In doing this they begin at the bottom about 3 ft. from the ground and regularly follow out each branch in rote as these are reached, barking each tiny twig to the end. They resort night after night to the same tree and commence where they left off the night before. When the process has been completed the tree looks as if it had had every bit of bark pulled off like a glove. The first time I observed a tree undergoing this process I was greatly puzzled to account for it, but discovered the cause the first occasion on which I sat up.

The largest rodent in India is the Porcupine (*Hystrix leucura*). These animals are found everywhere, both in the plains and inside the forest. They live in earths or in rocky crevices. Being the great excavators of the jungle, the use their burrows are put to by other animals has already been mentioned. Occasionally they come out in beats, but being nocturnal they usually lie up in their earths. The appearance of the porcupine is too well known to call for detailed description, but it is necessary to enter into some detail regarding their size.

Blanford gives this as "Head and body, 28 to 32 in. ; tail, 3 in. to 4 in. ; weight, 25 to 30 lb. ; mammae, 6." I have often seen mature animals of this size or even smaller, but I killed four animals out of one earth in Hoshangabad, all well over 40 lb. in weight and 35 in. long. Moreover, these animals only had four mammae, and it is probable this is the normal number. These are very peculiarly situated, being on the ribs behind the shoulder. It is possible that on the quills of the young hardening these would stab the mother when suckling from the usual place ; on the other hand, closely allied species with soft pelts have the mammae in the same position. Porcupines live on vegetables, fruits, and roots, and are very destructive in gardens. They also gnaw the dropped horns of deer. It is rare to find a horn which has been for any length of time in the forest which has not been treated in this way.

Porcupines commonly grunt and make the same noise when charging, which they do backwards. They can inflict the most dangerous wounds and I have seen a dog spitted through both lungs. The head is very sensitive and the slightest blow lays them out. They have wonderful powers of smell and are most intelligent

and hard to trap or poison. Some porcupines attacked the Kanna bulbs in Chilkalda garden, eating a yard or so of the row each night. Poison inserted into the living bulb some yards in advance of the place they had eaten to, was detected when reached, and avoided ; nor would they touch a potato with poison in it, although readily eating the others.

The best way to procure porcupines is to sit over their earths on a moonlight night. They usually emerge about half an hour after dark ; when doing this the peculiar rattling noise they make with their hollow quilled tails can often be heard. The flesh is excellent eating and resembles young pork.

The Province contains two hares. The Common Indian Hare (*Lepus ruficaudatus*) and Simcox's Hare (*Lepus simcoxi*). This animal has only recently been identified as a distinct species and is common in the west of the Province.

TRAGULINA

The Indian Chevrotain or Mouse Deer (*Tragulus meminna*), by which name it is nearly always known, is in no true sense a deer and is widely separated from the Cervidæ in many respects. Nevertheless, as a popular name, this title can hardly be improved upon as it is both mouse-like and deer-like. These little animals give one the impression of habitually standing and moving in a crouching manner. This is accentuated by the curved back, which is higher in the centre than at the withers and croup. The general colour is brown with elongated yellow or white spots on the sides ; sometimes the spots are joined in places, thus forming longitudinal bands. The stripes on the throat as well as the under surface are white.

Blanford's height of 10 to 12 in. at the shoulder and 5 to 6 lb. in weight are somewhat larger dimensions than any I have taken. I once kept a number of these animals as pets and they tamed easily. The only noise I ever heard them make was a feeble bleat. The bucks possess no horns, but are armed with two needle-like canine teeth, and are decidedly quarrelsome.

Mouse deer are common in the Mandla and Balaghat districts and eastward of this. They are also found in Chanda. I have never come across them in the western or trap zone of the Province, and as the jungle tribes do not know of them and have no name for them, it is unlikely they exist in this area. Without having seen them, I nevertheless strongly suspect their occurrence in the forests north of the Nerbudda belonging to the Khandwa district. This tract is situated in the Vindhyan Range, which is composed of sandstone. During the cold weather these little animals lead solitary lives in the jungle, and one occasionally flushes them by chance. In the hot weather they dwell in earths or in crevices between boulders. Under these conditions they are easily caught, and as many as five at a time have been smoked out of the lair by using burning grass with the addition of a few chillis to add pungency to the smoke. The flesh is whitish in colour and most excellent eating.

CROCODILES

Although not a mammal, the Crocodile or Mugger (*C. palustris*) is such an important factor in jungle life, that a few remarks on their habits and relations to other animals are not out of place.

So far as I know, only the mugger or blunt-nosed crocodile is found, although it is possible that some of

the rivers in the eastern portion of the Province which drain into the Bay of Bengal may also contain the garial. Forsyth mentions the garial as occurring in the Mahanadi, but the tributaries of this river with which I am acquainted did not contain it. The Godaveri, the Tapti, the Nerbudda, and their tributaries only contain the mugger. The absence of the garial is surprising, as there is no apparent factor which can explain this. Moreover, the northern tributaries of the Nerbudda are only separated from rivers belonging to the Gangetic system by a comparatively short distance, and all these rivers contain the garial or fish-eating crocodile. Crocodiles in the Central Provinces do not average so large as in other parts of India and animals of over 14 ft. in length are exceptional. Confirmed man-killers do not exist, but no doubt an occasional man is taken, and I have found human remains in their stomachs which did not appear to have ever been near the burning ghat. The details of their life history are little known. I have shot females containing about thirty mature eggs at the commencement of the hot weather, and shortly after this have killed other females which had evidently discharged their eggs, and I have seen newly hatched young at the beginning of the rains. The female is very secretive in laying her eggs, and although I have found turtles' eggs I have never found crocodiles'.

The only noise I have ever heard them make is a grunting sound.

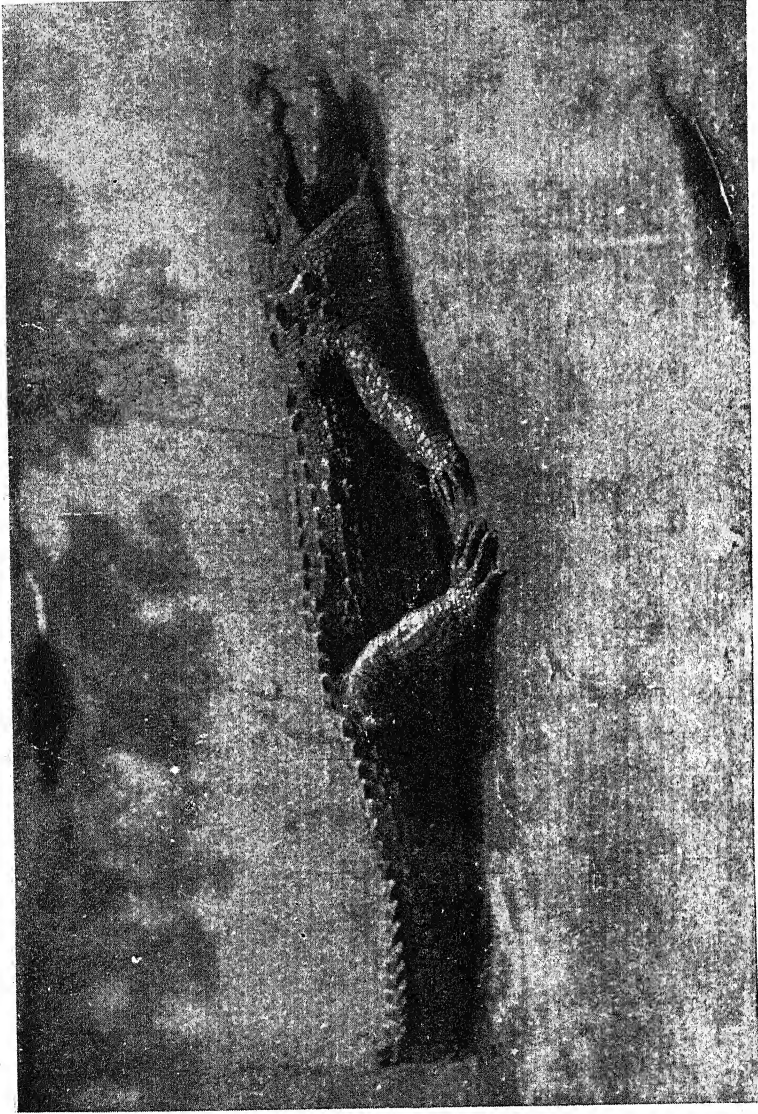
The crocodiles which remain in the main rivers do comparatively little harm to game, but those which ascend the side streams and spend the hot weather in jungle pools do an incalculable amount of damage. At this season the water is so restricted, game is often forced to drink at these pools, many of which are

tenanted by one or more muggers. I have known as many as five in one moderate-sized pool.

The following is a list of animals I have taken out of muggers: men, leopards, wild-dogs, hyenas, chital, the young of sambar and nilgai, four-horned antelope, barking deer, monkeys, domestic dogs, goats, calves, pigs, ducks, storks and a large variety of other birds. I once found eight teal duck inside a crocodile which had evidently been all swallowed at the same time. How this was achieved I cannot say. Although they kill animals which also destroy game, the great mass of their food consists of the young of deer.

The age to which crocodiles attain is not known, but it is certainly very great. They never seem to die natural deaths and are not preyed on or killed by anything except sportsmen, as the native shikari does not waste powder on them. It is probable that the same crocodiles return regularly to the same pool until they reach a size calling for a larger sphere. To kill out the crocodiles in a particular pool, therefore, frees it to some extent for several years, but even if this were not so it would be in the interests of game preservation to offer a small reward for crocodiles killed in Government Forest, which would pay for the organized slaughter of these pests in all the jungle pools at the beginning of the hot weather.

Crocodile can be caught on a hook, but they often detach the bait or reject it without getting hooked. By far the best way of catching them is with a large double-springed steel trap. This should be set in a few inches of water on some sandspit. A piece of meat should be tied underneath the trap and the trap should be attached by a rope to a log of wood. By placing the bait in the water, the crocodile smells it at once and from a long distance. On arriving at the spot, the



CROCODILE.



crocodile endeavours to scrape off the trap with his fore foot and gets caught. The floating log marks where he is and this can be retrieved and the crocodile landed. A crocodile is an exceedingly heavy animal. A beast of only 9 ft. in length will weigh as much as 245 lb. Nevertheless, when in the water, no effort is required to haul them out, but on getting on to land they can put up a good deal of resistance. I have killed large numbers of crocodiles with traps and seldom failed to get one each night, sometimes having three or four traps filled.

In shooting crocodiles it is well to remember that these will usually be found on land when the air is hotter than the water, and when this is not so they prefer the water. The amount of heat they can stand is astonishing. They can be seen in May basking at mid-day on black basalt rock which is so hot as to be unbearable to the hand. When doing this they often sleep with their mouths agape. In firing at a crocodile the spot to aim at is the neck—this is more paralysing than a head shot. Crocodiles, although shot dead, frequently escape, as they often have enough kick left in them to lash their tails and so slide slowly into deep water. In order to avoid this, a second shot should be placed into the spinal column just above the two hind legs. This effectively anchors the beast, as his body is then broken in three sections, and this is much more effective than putting another shot into the neck. If a pool contains more than one crocodile and one has been killed on the bank, it should be left in situ as a decoy, seeing which the others will rapidly emerge in fancied security. By this means I once killed five in half an hour.

Crocodiles possess a very acute sense of smell and have wonderful eyesight. I have known them smell

and remove a tiger's kill a distance of 500 yards from the pool. They frequently travel across country in the rains, and I once met one in a ploughed field miles from any holding ground. When pursued, this animal made for a jungle-clad hill and as I had no weapon it escaped. In taking their prey they usually lie concealed in mud or under the water and seize the unsuspecting deer by the head. On one occasion, I saw a small sounder of pig commence to drink from a shelving sandy beach. A crocodile on the opposite bank slipped quietly into the water and his knob-like eye appeared close to the pig without making the slightest ripple. With equal quietness this presently disappeared, and in a few seconds the mugger rushed up the beach and as he grounded he swung round his whole body and the tail swept two pigs off their feet into the water, neither of which appeared again.

THE PYTHON (*Python molurus*)

One other reptile may be mentioned, namely, the Python. Compared with the Terai these snakes are rare in the Province, but one occasionally comes across them or sees the marks of their bodies on some dusty road. I once came on one which had just swallowed a male barking deer, horns and all. It was quite helpless and was easily killed. A friend of mine once came on a chital stag which had been killed by a python. The horns were more than the snake could swallow, and in order to get rid of these he severed a strip of skin along the back, leaving it attached to the skull, and by this means he bound the head to a small tree. Having accomplished this, the snake then revolved the body until the head was twisted off. Although not actually observed in the act the cir-

circumstances justified the assumption that this is what took place. This display of forethought and reason on the part of an animal so low down in the scale of development is possibly the most remarkable thing of its kind I have ever come across.

DEFER

APPENDIX

LIST OF ANIMALS MENTIONED, WITH SYSTEMATIC AND VERNACULAR NAMES.

Systematic names according to Blanford.

Vernacular names : H = Hindustani, K = Korku, G = Gondi, M = Marathi,
T = Telegu.

Name.	Systematic name.	Vernacular.	Remarks.
Bengal Monkey	<i>Macacus rhesus</i>	Bandar	H.
Langoor . . .	<i>Semnopithecus entellus</i>	Langur } Bandar }	H.
Tiger	<i>Felis tigris</i>	Bagh } Sher }	Tiger
		Baghni } Sherni }	Tigress
		Koola Puli	K. G. also T. in South Chanda
		Burkāl	G. in South Chanda
Leopard . . .	<i>Felis pardus</i>	Tendwa Gulbagh	H. Northern name : refers to big variety ; trans. "Spot tiger"
		Adh Nahra	Big variety Nimar
		Bibart Biwat Borbacha Gorbacha Chita Sonoria	M. H. K.

Name.	Systematic name.	Vernacular.	Remarks.
Fishing Cat . .	<i>Felis viverrina</i>	Khupya-bagh	H.
Indian Desert Cat	<i>Felis ornata</i>	Jangli-billi	H. "Jungle Cat"
Jungle Cat . .	<i>Felis chaus</i>	Jangli-billi	H.
Caracal . . .	<i>Felis caracal</i>	Siyah-gush	"Black ears" Persian word
Hunting Leopard	<i>Cynælurus jubatus</i>	Chita } Chitra }	H.
Large Indian Civet	<i>Viverra zibetha</i>	Khatas	(not confined to this animal)
Small Indian Civet	<i>Viverricula malaccensis</i>	Khatas	
Indian Palm Civet	<i>Paradoxurus niger</i>	Mashk-billai Khatas Jhar-ka-kutta	"Tree dog"
Common Indian Mongoose	<i>Herpestes mungo</i>	Newal } Mangus }	H.
Ruddy Mongoose	<i>Herpestes smithi</i>	Koral } Mangus }	H.
Striped Hyena .	<i>Hyena striata</i>	Lakarbaga Jhirak } Taras }	Northern name { Southern name
Indian Wolf. .	<i>Canis pallipes</i>	Dhopre Renhra Bheriya Lānga Bigāra	K. G. H. M. Mandla
Jackal	<i>Canis aureus</i>	Gidar Laraiya } Kola } Kolial }	H.
Indian Wild-Dog	<i>Cyon dukhunensis</i>	Son-kutta	H. "Golden dog"
		Ran- } Ban- } Kutta Jangli }	H. "Wild or jungle dog"
		Kolsa Eram-naiko	M. G.
Indian Fox . .	<i>Vulpes bengalensis</i>	Lumri } Lokri } Lukhariya }	H.

Name.	Systematic name.	Vernacular.	Remarks.
Indian Fox . .	<i>Vulpes bengalensis</i>	Kokri Kekri	M. G.
Indian Ratel .	<i>Mellivora indica</i>	Boi Reench Biju	(also applied to badger)
Common Otter .	<i>Lutra vulgaris</i>	Ud Pani-kutta Jal-manus	H. "Water Dog"
Sloth Bear . .	<i>Melursus ursinus</i>	Reench Bhalu Aswal Bāna Yerid } Yerāj }	Southern Northern M. K. G.
Madras tree-shrew	<i>Tupaia ellioti</i>	Orar }	Hoshangabad
Large Brown Fly- ing Squirrel	<i>Pteromys oral</i>	Ural/ Pank mānuār	and Melghat Nimar
Large Indian Squirrel	<i>Sciurus indicus</i>	Jangli gilheri	"Jungle squirrel"
		Karrat Shekra Pārbāt musa	H. G.
Palm Squirrel	<i>Sciurus palmarum</i>	Gilheri } Tidra } Khadi }	H.
Indian Porcupine	<i>Hystrix leucura</i>	Sayel } Sahi } Sayi } Jekra Hoigu	H. K. G.
Common Indian Hare	<i>Lepus ruficaudatus</i>	Khargosh	H.
Simcox's Hare .	<i>Lepus simcoxi</i>	Malol	G.
Indian Elephant	<i>Elephas maximus</i>	Koarli Hathi Hathni	K. H. Male H. Female
Gaur	<i>Bos gaurus</i>	Gaur Jangli Bhains } " Hela } Boda }	Chanda "Jangli ox"

Name.	Systematic name.	Vernacular.	Remarks.
Gaur	Bos gaurus	Ban Boda Ran Hela „ Kulga Ganiva Ritkil	Wild ox K. bull K. cow (used for tame buffalo cow as well)
Buffalo	Bos bubalus	Arna Bhainsa Boda Gera erumi Bārreh Nilgai	H. H. { often pre- fixed by Jangli or Ban or Ran H. { indicating wild G. (Māria gond) “Blue cow”
Nilgai	Boselaphus tragocamelus	Nil Roj Rui Rojera Roz Rozeri Bherki	Various local names
Four Horned Antelope	Tetracerus quadricornis	Jangli Bakri Chausingha	“Jungle goat” “Fourhorned”
Black Buck . .	Antelope cervicapra	Haran Kala Hiran Harni Kutsar	H. “Black buck” Female K.
Indian Gazelle .	Gazella bennetti	Chinkara Chikara Kurās Kalsipi	H. H. H. G.
Barking Deer .	Cervulus muntjac	Kakar Berki Guttri Jangli	H. H. G. & K. “Jungle

menda

sheep”

Name.	Systematic name.	Vernacular.	Remarks.
Barasingha . . .	<i>Cervus duvauceli</i>	Barasingh Gaoni Dhak Gaoni Ghesār māu	" Twelve horned " Male } Dindori Female } Tahsil South Chanda
Sambar . . .	<i>Cervus unicolor</i>	Sambhar Dhak male Roi female Samar Mauk Bāra Deria Māu Dongaria Dhak	H. Melghat H. Nagpur G. South Chanda Mandla dis- tinguishing from Bara- singh
Chital . . .	<i>Cervus axis</i>	Chital Chitra Darkar Kā Kūr. male Dāppi	K. Nimar T. South Chanda
Mouse Deer . .	<i>Tragulus meminna</i>	Pisora Māngwari Musa Hiran	Mandla South Chanda
Indian Wild-Pig	<i>Sus cristatus</i>	Jangli Soor Badh Janwar Bāra Dookar Sukri Pāddi Mugger	H. Wild-pig Mandla M. Male K. G. H.
Mugger or Blunt-nosed Crocodile Python . . .	<i>Crocodilus palustris</i> <i>Python molurus</i>	Ājgār	

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